City of LEWISTON Maine

CONTRACT AND CONTRACT DOCUMENTS

FOR

HART BROOK WATER QUALITY RESTORATION
LEWISTON INDUSTRIAL PARK
PHASE 1

Bid Number: 2015-004
Project #9-474-15

January 2015

DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION
103 ADAMS AVENUE
LEWISTON, MAINE 04243

Tel. (207) 513-3003 Fax: (207) 784-5647

CITY OF LEWISTON, MAINE
DEPARTMENT OF PUBLIC WORKS

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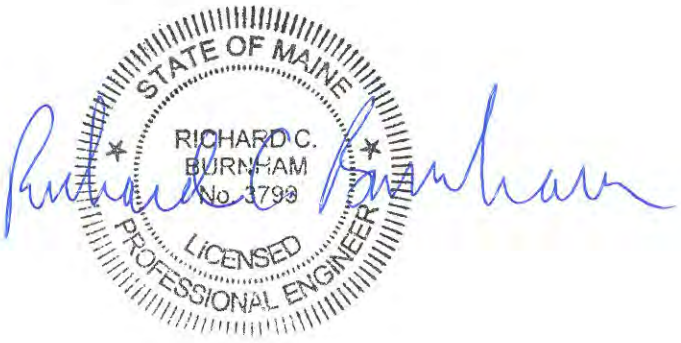

PREPARED BY
CITY OF LEWISTON
ENGINEERING DIVISION

HART BROOK WATER QUALITY RESTORATION
LEWISTON INDUSTRIAL PARK
PHASE 1
BID No. 2015-004

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Bid No. 2015-004
Bid Date: January 20, 2015

CITY OF LEWISTON, MAINE

NOTICE TO CONTRACTORS

Sealed proposals for the **Hart Brook Water Quality Restoration, Lewiston Industrial Park – Phase I** project will be received by the office of the Director of Budget/Purchasing, until 2:00 o'clock PM, on **January 20, 2015.**

The work for the **Hart Brook Water Quality Restoration, Lewiston Industrial Park – Phase I** project shall consist of, but not be limited to, the complete and satisfactory construction of three (3) stormwater filter basins, one (1) stormwater treatment structure, 9.5mm Hot Mix Asphalt (hand placed), 6" diameter, 12" diameter and 30" diameter storm drain, 4' diameter and 5' diameter catch basins, 3' radius granite curb, plain riprap, void-filled riprap, landscaping plants, loam, seed, mulch; and all other incidental work as necessary to satisfactorily complete the project as outlined or implied in the Plans/Specifications.

All bidders are required to attend a pre-bid conference to be held at the Lewiston Public Works Building, at 103 Adams Ave., Lewiston, Maine on **January 8, 2015** at 10:00 A.M. Attendance at this meeting by the Bidder or his/her qualified representative is a mandatory prerequisite for the acceptance of a bid from that Contractor.

Each bidder is required to state in his/her Proposal his/her name and place of residence and the names of all persons or parties interested as principals with him/her; and that the Proposal is made without any connection to any other bidder making any Proposal for the same work; and that no person acting for, or employed by, the City of Lewiston is directly or indirectly interested in the Proposal or in any contract which may be entered into to which the Proposal relates, or in any portion of the profits there from, except as provided by the City Charter.

The Proposal must be signed by the bidder with his/her full name and address and be enclosed in a sealed envelope together with the bid security. The sealed envelope shall be marked with the name and address of the bidder and entitled:

PROPOSAL FOR

HART BROOK WATER QUALITY RESTORATION
LEWISTON INDUSTRIAL PARK
PHASE 1

and addressed to: "Director of Budget & Purchasing, City Hall, Lewiston, Maine". If the Proposal is forwarded by mail, the sealed envelope containing the Proposal and marked as above must be enclosed in a second envelope which shall be addressed to: "Director of

Budget & Purchasing, 27 Pine Street, City Hall, Lewiston, Maine 04243-0479." All mailed Proposals should be sent by registered mail to insure delivery.

Any bidder may withdraw his/her Proposal prior to the scheduled time for the opening of Proposals upon presentation to the Director of Budget & Purchasing of a request, in writing, to do so. Any bidder who withdraws his/her Proposal within thirty (30) days after the actual opening thereof shall be considered to have abandoned his/her Proposal and the bid security accompanying the Proposal will be forfeited to the City of Lewiston. Any Proposal received after the scheduled opening time will not be considered.

The City reserves the right to negotiate with the low bidder to bring projects down to within budget.

The Finance Committee reserves the right to waive any formality and may consider as informal any Proposal not prepared and submitted in accordance with these provisions. The Finance Committee reserves the right to accept any Proposal or reject any or all Proposals if it is deemed to be in the public interest to do so.

No Proposal will be considered unless it is accompanied by a bid security in the form of a bid bond or certified check in the amount of ten percent (10%) of the total bid price, made out in favor of the City of Lewiston. All bid securities will be released upon deliverance of a signed Contract or, if no Contract award is made, within forty-five (45) days after the opening of the Proposals, unless forfeited as herein stipulated.

The Contract must be signed within ten (10) days, Saturdays, Sundays, and holidays excluded, after the date of notification to the bidder by the Director of Budget & Purchasing of the acceptance of his/her Proposal and readiness of the Contract to be signed. If the bidder fails or neglects, after such notification, to execute the Contract, the Finance Committee may determine that the Proposal has been abandoned; and, in such case, the bid security accompanying the Proposal shall be forfeited to the City of Lewiston.

A Performance Bond and a Labor and Material Payment Bond, preferably executed on AIA Bond Form Number A311, in an amount equal to the total Contract price, of a surety company satisfactory to the Director of Budget & Purchasing, will be required of the successful bidder to ensure completion of the work and the proper fulfillment of the conditions of the Contract. The total Contract price shall mean the total bid price as stated in the Proposal based on the estimated quantities of the various items of work.

The work must be commenced within ten (10) days after the date of the Contract signing unless otherwise specified in the Specifications or directed by the Director of Budget & Purchasing, in writing, and is to be continued with diligent regularity until its completion within the time limit specified.

All Proposals must be made on the blank Proposal Form bound in the Contract Documents, or as otherwise provided for in the Specifications. Bidders shall state prices for each separate item of work as called for in the Proposal Form. These prices are to cover all

expenses incidental to the completion of the work in full conformity with the Contract Documents.

The prices must be stated both in words and figures. Should a discrepancy be found between the prices written in words and the prices written in figures, the prices written in words shall govern. Proposals which do not contain prices for all items which are called for or which otherwise are not in conformity with this Notice may be rejected.

Each bidder shall make his/her Proposal from his/her own examinations and estimates, and shall not hold the City, its agents or employees, responsible for, or bound by, any schedule, estimate, sounding, boring, or any plan thereof; and shall, if any error in any plan, drawing, specification or direction relating to anything to be done under this Contract comes to his/her knowledge, report it at once, in writing, to the Engineer.

All materials and labor required to complete the work shall be supplied by the Contractor unless otherwise provided for in the Special Provisions, Plans or the Standard and Supplemental Specifications. The cost and expense of all the necessary labor, tools and equipment required to complete the work shall be included in the prices stated in the Proposal.

The City may set off any unpaid taxes, fees or other charges or other amounts owed by the contractor against the contract price, in full or partial satisfaction.

Plans and Specifications can be obtained free of charge on the City of Lewiston web site under Finance Dept/Bids and Awards (www.lewistonmaine.gov).

All questions by prospective bidders pertaining to the Contract Documents, Plans and Specifications must be received, in writing, by the Engineer, at least five (5) days before the date set for the opening of the Proposals. Any questions which, in the opinion of the Director of Budget & Purchasing, require interpretation, will be posted to the City of Lewiston web site and will be e-mailed to the plan holders, with the interpretation, in the form of a numbered Addendum, to each person or firm who has taken out a set of Contract Documents, not later than three (3) days prior to the scheduled opening of the Proposals. Addenda issued later than three (3) days prior to the scheduled opening of the Proposals may be by e-mail, telephone, or fax machine. Bidders shall acknowledge receipt of all Addenda in the space provided therefore in the Proposal Form, whether the Addenda are in response to questions or otherwise issued by the City and whether the Addenda are received by e-mail, telephone or fax.

The Special Provisions, Plans, and the Standard and Supplemental Specifications delineate the particular project to which the Contract Documents pertain. Should any discrepancy be found to exist between the Supplemental Specifications and the Standard Specifications and/or the Contract Plans, the Supplemental Specifications and/or Contract Plans shall govern.

If the Bid Price of any or several bid items submitted with this Proposal appear to be extremely low or high, compared to the actual cost of performing the work, the Bidder may be asked to explain, in writing, how the work in question is to be performed at the price or prices bid before a decision is made by the City to award a Contract or reject the Bid.

Proposals will be considered irregular and will be rejected for the following reasons:

A. If the Proposal is on a form other than that furnished by the City or if the form is altered in any way.

B. If there are unauthorized additions, conditional or alternate bids, or irregularities of any kind which may make the Proposal incomplete, indefinite, or ambiguous as to its meaning.

C. If the Bidder adds any provisions reserving the right to accept or reject an award or to enter into a Contract pursuant to an award.

D. If the Proposal does not contain a unit price for each pay item listed unless otherwise specified.

E. If any of the bid prices are unbalanced, or do not reflect the actual cost required to perform the work, as outlined in the Plans and Specifications.

CITY OF LEWISTON

PROPOSAL FOR

HART BROOK WATER QUALITY RESTORATION
LEWISTON INDUSTRIAL PARK
PHASE 1
BID No. 2015-004

To: Director of Budget & Purchasing
City Hall, Lewiston, Maine

Dear Sir/Madam:

The undersigned hereby declares that he/she has carefully examined the location of the proposed work, the proposed Contract Form and the Contract Documents therein referred to and that he/she proposes and agrees, if this Proposal is accepted, that he/she will contract with the City of Lewiston, by its City Administrator, to provide all machinery, tools, labor, equipment and other means of construction and to do all the work and to furnish all the materials, except those specified in the Specifications to be furnished by the City, necessary to complete the work in the manner and time therein prescribed, in accordance with the conditions and requirements set forth in the Contract Documents and the requirements of the Engineer and/or Director of Public Works as provided for therein; and that he/she will accept in full payment therefore the following sums to wit:

ITEM NO.	EST. QTY	PAY UNIT	ITEM DESCRIPTION AND UNIT		TOTAL
1	1	LS	Remove Concrete Channel		
			_____		
			_____($_____)	LS	$_____
2	5	EA	Convert Existing Catch Basin to Manhole		
			_____		
			_____($_____)	EA	$_____
3	4600	SF	Fine Grade Driveway Apron		
			_____		
			_____($_____)	SF	$_____

4	60	TON	Hot Mix Asphalt, 9.5 mm (hand-placed)			
			_____			
			_____($_____)	TON	$_____	
5	14	LF	6" Dia. Storm Drain			
			_____			
			_____($_____)	LF	$_____	
6	87	LF	12" Dia. Storm Drain			
			_____			
			_____($_____)	LF	$_____	
7	201	LF	30" Dia. Storm Drain			
			_____			
			_____($_____)	LF	$_____	
8	1	EA	4' Dia. Catch Basin			
			_____			
			_____($_____)	EA	$_____	
9	3	EA	5' Dia. Catch Basin			
			_____			
			_____($_____)	EA	$_____	
10	1	LS	Filter Basin #1 (12'X4')			
			_____			
			_____($_____)	LS	$_____	
11	1	LS	Filter Basin #2 (11'X3')			
			_____			
			_____($_____)	LS	$_____	

12	1	LS	Filter Basin #3 (13'X7')			
			_____			
			_____($_____)	LS	$_____	
13	1	LS	Stormwater Treatment Structure			
			_____			
			_____($_____)	LS	$_____	
14	29	LF	3' Radius Granite Curb			
			_____			
			_____($_____)	LF	$_____	
15	5	CY	Riprap (D50=6")			
			_____			
			_____($_____)	CY	$_____	
16	20	CY	Riprap (D50=12")			
			_____			
			_____($_____)	CY	$_____	
17	125	CY	Void-Filled Riprap (D50=12")			
			_____			
			_____($_____)	CY	$_____	
18	192	LF	12" Dia. Coir Log			
			_____			
			_____($_____)	LF	$_____	
19	148	EA	Landscaping Plants (2 Gallon)			
			_____			
			_____($_____)	EA	$_____	

20	15	EA	Landscaping Plants (5 Gallon)			
			_____			
			_____($_____)	EA	$_____	
21	200	SY	Erosion Control Blanket			
			_____			
			_____($_____)	SY	$_____	
22	50	CY	Loam			
			_____			
			_____($_____)	CY	$_____	
23	300	SY	Seed (MEDOT Method No. 2)			
			_____			
			_____($_____)	SY	$_____	
24	200	SY	Seed (Wetland Seed Mix)			
			_____			
			_____($_____)	SY	$_____	
25	300	SY	Mulch (Erosion Control Only)			
			_____			
			_____($_____)	SY	$_____	
26	10	HR	Hand Labor Straight Time			
			_____			
			_____($_____)	HR	$_____	
27	10	HR	Front End Loader with Operator			
			_____			
			_____($_____)	HR	$_____	

28	10	HR	All Purpose Excavator with Operator _____ _____($_____)	HR	$_____
29	1	LS	Temporary Soil Erosion and Water Pollution Control _____ _____($_____)	LS	$_____
30	1	LS	Traffic Control _____ _____($_____)	LS	$_____
31	1	LS	Mobilization, Misc & Cleanup _____ _____($_____)	LS	$_____

TOTAL: _____

_____($_____)

The undersigned acknowledges the receipt of Addenda numbered _____.

The undersigned further agrees that, after notification by the Director of Budget & Purchasing of the acceptance of his/her Proposal and the readiness of the Contract for signature, he/she will execute the Contract and furnish the required Bonds within ten (10) days, Saturdays, Sundays and Holidays, excluded, and that he/she will commence the work within ten (10) days after the execution of the Contract and deliverance of the Bonds, unless otherwise specified in the Supplemental Specifications or directed by the Director of Public Works or City Engineer in writing; and that he/she will prosecute the work to its completion within the time limit specified in the Supplemental Specifications. The undersigned further agrees that there shall be deducted from monies due the Contractor, not as a penalty, but as inspection costs, the sum of five hundred ($500.00) dollars for each working day beyond the time limit specified in the Supplemental Specifications which is required by the Contractor to complete the whole work to the satisfaction of the Engineer and the Director of Public Works.

The undersigned further agrees that in the employment of labor, preference will be given, all other things being equal, to the citizens of Lewiston and of the State of Maine, in that

order. The undersigned hereby further declares that the only persons or parties interested in this Proposal, as principals, are named below; that the Proposal is made without any connection with any other person or party making any Proposal for the same work; and that no person acting for or employed by the City of Lewiston is directly or indirectly interested in this Proposal or in any contract which may be made under it or in profits expected to arise there from, except as provided by the City Charter. The full names and addresses of all persons and parties interested in this Proposal, as principals, are as follows: (Give first and last names in full; and in the case of a Corporation, give names and addresses of President, Treasurer and Manager; and in case of a Partnership, give names and addresses of members):

_____

_____

_____

_____

Accompanying this Proposal is a bid security deposit in the amount of $(_____), which is to become the property of the City of Lewiston, by forfeiture, if the undersigned fails, after notification by the Director of Budget & Purchasing of the acceptance of his/her Proposal, to execute a Contract with the City and furnish the required Bonds within the time agreed to herein; or, in case the undersigned withdraws his/her Proposal within thirty (30) days after the opening of the Proposals. Otherwise, the deposit will be returned to the undersigned in accordance with the provisions in the Notice to Contractors.

Signature of person, firm, or corporation making bid:

_____

By:_____

Legal Address:

_____

_____

_____

Principal place of business:

_____

FIRM'S I.R.S. IDENTIFICATION NO: _____ Date: _____

Address to which all correspondence and notifications are to be sent:

_____

_____

Phone No: _____

CITY OF LEWISTON, MAINE

CONTRACT FOR

HART BROOK WATER QUALITY RESTORATION
LEWISTON INDUSTRIAL PARK
PHASE 1
BID No. 2015-004

This Agreement, made and entered into this _____ day of _____(Month) in the year two thousand fifteen, by and between the City of Lewiston, Maine, a municipal corporation existing under the laws of the State of Maine, hereinafter called "Owner", by its City Administrator, party of the first part, and

_____

hereinafter called "Contractor", with legal address and principal place of business at:

_____

_____

party of the second part:

WITNESSETH:

That the parties to these presents, each in consideration of the covenant and agreements on the part of the other herein contained, have covenanted and agreed and do hereby covenant and agree, the party of the first part for itself and the party of the second part for himself/herself and his/her heirs, executors, administrators and assigns under the penalties expressed in the Performance Bond and the Labor and Material Payment Bond as follows:

That this Agreement includes the following documents, hereinafter referred to as Contract Documents, which are attached hereto and incorporated by reference into this Agreement:

A. Notice to Contractors

B. Proposal

C. Contract

D. Notice of Award

E. Notice to Proceed

F. Supplemental Specifications

G. Standard Specifications

H. Contract Plans, if any

I. Addenda, if any

J. Federal Conditions, if any

That the party of the second part will do all the work, furnish all the materials, tools and equipment, except as otherwise specified, and do everything necessary and proper for performing and faithfully completing the work required by the Contract Documents in strict conformity with the provisions of the Contract Documents within the time specified in the Special Provisions, Plans, and the Standard and Supplemental Specifications. That the party of the first part will pay the party of the second part as full compensation for well and faithfully completing the whole work according to the Contract Documents as follows:

ITEM NO.	EST. QTY	PAY UNIT	ITEM DESCRIPTION AND UNIT		TOTAL
1	1	LS	Remove Concrete Channel		
			_____		
			_____($_____)	LS	$_____
2	5	EA	Convert Existing Catch Basin to Manhole		
			_____		
			_____($_____)	EA	$_____
3	4600	SF	Fine Grade Driveway Apron		
			_____		
			_____($_____)	SF	$_____
4	60	TON	Hot Mix Asphalt, 9.5 mm (hand-placed)		
			_____		
			_____($_____)	TON	$_____
5	14	LF	6" Dia. Storm Drain		
			_____		
			_____($_____)	LF	$_____

6	87	LF	12" Dia. Storm Drain			
			_____			
			_____($_____)	LF	$_____	
7	201	LF	30" Dia. Storm Drain			
			_____			
			_____($_____)	LF	$_____	
8	1	EA	4' Dia. Catch Basin			
			_____			
			_____($_____)	EA	$_____	
9	3	EA	5' Dia. Catch Basin			
			_____			
			_____($_____)	EA	$_____	
10	1	LS	Filter Basin #1 (12'X4')			
			_____			
			_____($_____)	LS	$_____	
11	1	LS	Filter Basin #2 (11'X3')			
			_____			
			_____($_____)	LS	$_____	
12	1	LS	Filter Basin #3 (13'X7')			
			_____			
			_____($_____)	LS	$_____	
13	1	LS	Stormwater Treatment Structure			
			_____			
			_____($_____)	LS	$_____	

14	29	LF	3' Radius Granite Curb			
			_____			
			_____($_____)	LF	$_____	
15	5	CY	Riprap (D50=6")			
			_____			
			_____($_____)	CY	$_____	
16	20	CY	Riprap (D50=12")			
			_____			
			_____($_____)	CY	$_____	
17	125	CY	Void-Filled Riprap (D50=12")			
			_____			
			_____($_____)	CY	$_____	
18	192	LF	12" Dia. Coir Log			
			_____			
			_____($_____)	LF	$_____	
19	148	EA	Landscaping Plants (2 Gallon)			
			_____			
			_____($_____)	EA	$_____	
20	15	EA	Landscaping Plants (5 Gallon)			
			_____			
			_____($_____)	EA	$_____	
21	200	SY	Erosion Control Blanket			
			_____			
			_____($_____)	SY	$_____	

22	50	CY	Loam		
			_____		
			_____($_____)	CY	$_____
23	300	SY	Seed (MEDOT Method No. 2)		
			_____		
			_____($_____)	SY	$_____
24	200	SY	Seed (Wetland Seed Mix)		
			_____		
			_____($_____)	SY	$_____
25	300	SY	Mulch (Erosion Control Only)		
			_____		
			_____($_____)	SY	$_____
26	10	HR	Hand Labor Straight Time		
			_____		
			_____($_____)	HR	$_____
27	10	HR	Front End Loader with Operator		
			_____		
			_____($_____)	HR	$_____
28	10	HR	All Purpose Excavator with Operator		
			_____		
			_____($_____)	HR	$_____
29	1	LS	Temporary Soil Erosion and Water Pollution Control		
			_____		
			_____($_____)	LS	$_____

30	1	LS	Traffic Control		
			_____		
			_____($_____)	LS	$_____
31	1	LS	Mobilization, Misc & Cleanup		
			_____		
			_____($_____)	LS	$_____
			TOTAL: _____		
			_____($_____)		

The party of the second part represents and warrants:

A. That he/she is financially solvent; and is experienced in and competent to perform the work; and is able to furnish the plant, materials, supplies, labor, and equipment to be furnished by him/her; and,

B. That he/she is familiar with all Federal, State, Municipal and Departmental laws, ordinances and regulations which may in any way affect the work or those employed therein; and,

C. That such temporary and permanent work required by the Contract Documents to be done by him/her can be satisfactorily constructed and used for the purposes for which it is intended; and that such construction will not injure any person or damage any property other than that damage caused by the construction; and,

D. That he/she has carefully examined the Contract Documents and the site of the work; and from his/her own investigation has satisfied himself/herself as to the nature and location of the work, the character, quality and quantity of surface and subsurface material likely to be encountered, the character of equipment and other facilities needed for the performance of the work, the general and local conditions; and all the other materials and conditions which may in any way affect the work or its performance.

IN WITNESS WHEREOF, the said City, by its City Administrator and the said

_____

_____

_____

By its _____ thereunto duly authorized have hereunto set their hands and seals the day and year first above written.

Signed in the presence of:

_____ By: _____
Witness Edward Barrett, City Administrator

_____ By: _____
Witness Contractor

NOTICE OF AWARD

To:

Project Description: HART BROOK WATER QUALITY RESTORATION, LEWISTON INDUSTRIAL PARK – PHASE 1

Bid #: 2015-004

The City of Lewiston has considered the BID submitted by you for the above described WORK in response to its Advertisement for Bids dated _____and Information for Bidders.

You are hereby notified that your BID has been accepted for items _____ for a total award of_____. You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance Security and certificates of insurance within ten (10) days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said City of Lewiston will be entitled to consider all your rights arising out of the City acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The City will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of the NOTICE OF AWARD to the City of Lewiston.

Dated this:_____

By: _____
Project Engineer

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged

by (firm) _____

this the _____day of _____, 2015

By: _____

Title: _____

NOTICE TO PROCEED

To:

Project Description: HART BROOK WATER QUALITY RESTORATION, LEWISTON INDUSTRIAL PARK – PHASE 1

Bid #: 2015-004

You are hereby notified to proceed with the work entitled _____, together with all necessary appurtenances, and to diligently prosecute the work.

You are instructed to immediately take the necessary steps for execution of the work within ten (10) calendar days **(or other start time as specified)** from the date of this Notice to Proceed. The work is to be completed by _____ as stated in the Contract.

By: _____
Project Manager

Title:_____

Date:_____

DIVISION 10

SUPPLEMENTAL SPECIFICATIONS

DIVISION 10

SUPPLEMENTAL SPECIFICATIONS

10.01 SCOPE OF WORK

The general scope of the project includes, but is not limited to, the following:

The work for the **Hart Brook Water Quality Restoration, Lewiston Industrial Park – Phase I** project shall consist of, but not be limited to, the complete and satisfactory construction of three (3) stormwater filter basins, one (1) stormwater treatment structure, 9.5mm Hot Mix Asphalt (hand placed), 6" diameter, 12" diameter and 30" diameter storm drain, 4' diameter and 5' diameter catch basins, 3' radius granite curb, plain riprap, void-filled riprap, landscaping plants, loam, seed, mulch; and all other incidental work as necessary to satisfactorily complete the project as outlined or implied in the Plans/Specifications.

10.02 TIME LIMIT

The Contractor shall complete the work outlined in the Contract Documents by no later than **May 30, 2015**. The Contractor shall be responsible for ordering his/her materials promptly.

The Director of Public Works or his/her authorized representative may extend the Time Limit, if the Contractor submits, in writing, evidence that he/she cannot complete the Project within the Time Limit specified because of long delivery time on the materials or other justifiable reason.

10.03 SAFETY

During the course of the work, the Contractor shall assume full responsibility for the safety and protection of all workers and the general public, and shall meet all applicable local, State and Federal safety standards. The contractor shall maintain safe and continuous vehicular and pedestrian traffic while work is being done.

The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act. The Contractor shall have a competent person or persons as required under the Occupational Safety and Health Act on the site to inspect the work and to supervise the conformance of the Contractor's operations with the regulations of the Act. Bidders are urged to make themselves familiar with these requirements of the regulations.

10.04 PRECONSTRUCTION AND UTILITY CONFERENCE

A Preconstruction and Utility Conference will be held between the Contractor, Utility Companies, and the City of Lewiston, at a mutually agreed time, to review the Contractor's

proposed methods of complying with the requirements of the Plans and Specifications and the Regulations of the City.

At the Preconstruction meeting the Contractor shall submit to the Engineer a work schedule, traffic control plan, and Shop Drawings, submittals, erosion control plan and contractor's safety plan.

10.05 CHANGE IN THE SCOPE OF WORK

The City of Lewiston reserves the right to add or delete portions of the work required under this Contract, using unit prices established in the Proposal. The Contractor's attention is directed to Sections **20.29**, **"Extra Work" and 20.30 "Reduction of Work"** of the Specifications. If no unit price exists, a change order must be negotiated between the City of Lewiston and the Contractor.

10.06 MATERIALS

The Contractor shall supply all materials, equipment, and labor as necessary to complete the Project in accordance with the Plans and Specifications.

Storm Drain

ADS SaniTite® HP pipe shall be used for all storm drain pipe installations that are 12" diameter or larger. For storm drain installation that is less than 12", the pipe material shall be PVC, ADS N-12 (dual wall, smooth interior), or equivalent. The contractor may choose to use either 13 foot or 20 foot pipe lengths.

Riprap (D50=6")

Materials shall meet the requirements below. The control of gradation shall be done by visual inspection and shall conform to the following gradation:

The riprap used shall be have an approximate d_{50} (mean particle size) of 6 inches.

% Smaller Than Given Size By Weight	Intermediate Rock Dimension (inches)
70-100	12
50-70	9
35-50	6
2-10	2

The Riprap (D50=6") shown on the plans shall be installed with a non-woven geotextile Mirafi 140-N or approved equivalent. The cost associated with the installation of the geotextile shall be considered incidental to the riprap item.

Riprap (D50=12")

Materials shall meet the requirements below. The control of gradation shall be done by visual inspection and shall conform to the following gradation:

The riprap used shall be have an approximate d_{50} (mean particle size) of 12 inches.

% Smaller Than Given Size By Weight	Intermediate Rock Dimension (inches)
70-100	21
50-70	18
35-50	12
2-10	4

The Riprap (D50=12") shown on the plans shall be installed with a 6" deep layer of crushed rock. The cost associated with the installation of the crushed rock shall be considered incidental to the riprap item.

Void-Filled Riprap (D50=12")

Where "Void-Filled Riprap" is designated on the Contract Plans, Riprap shall be missed with the materials and associated proportions listed in the table below to fill the voids of the riprap.

Approximate Proportions (Loader Buckets)	Material Type	Material Description
6	Riprap	D_{50} = 12" (see table below)
2	Void-Fill Material (Cobble)	2 to 5-inch cobble (round washed river rock that is well-graded)
2	Void-Fill Material (Gravel)	Aggregate Subbase Materail/MEDOT "Type D" Gravel (see Section 50.17 for gradation)
1	Void-Fill Material (Crushed Rock)	Crushed Rock (Aggregate Base/MEDOT "Type A" Crushed Rock)
Top Layer for Exposed Void-Filled Riprap	Top Dressing	Additional mixture of cobble shall be mixed in on the surface of exposed Void-Filled riprap prior to compaction of the Void-Filled riprap. Cobbles shall be fully embedded into the mass of Void-Filled riprap

Note: Mix proportions and material gradations are approximate and are subject to adjustment by the engineer. No adjustment in unit price for Void-Filled riprap will be allowed based on modifications to the mix proportions.

The riprap and void-filled material shall be thoroughly mixed prior to placement and shall be installed and compacted so that dense, interlocked layer of riprap and void filled material is provided with riprap voids completely filled.

The riprap used shall be have an approximate d_{50} (mean particle size) of **12 inches**. The control of gradation shall be done by visual inspection and shall conform to the table above for Riprap (D50=12”):

The measurement for payment shall be the total number of cubic yards of Riprap and Void-Filled riprap installed, measured in place, in accordance with the drawings and specifications or otherwise directed by the Engineer.

Coir Log

The coir logs shown on the plans shall be Premium Coir Logs manufactured by East Coast Erosion Control or approved equivalent. The diameter of the coir logs shall be 12”. The bid item cost shall include all installation costs including any staking as recommended by the manufacturer.

Erosion Control Blanket

Work under this bid item shall be done in accordance with SECTION 613 – EROSION CONTROL BLANKETS of the Maine Department of Transportation Standard Specifications - latest revision.

10.07 MEASUREMENT AND PAYMENT:

The pay limits for materials to be used on the project shall be as outlined in the following chart:

Material	Pay Limit
Select Backfill	Pipe O.D. plus 3 feet, after any stockpiled fill has been exhausted and with prior approval of the Engineer
Crushed Stone	Incidental to the individual pipe and structure items
Aggregate Base (Trenches)	11’ width
Aggregate Base (Services, hydrant leads, CB leads)	6' width
Aggregate Base (Outside Trenches)	In place dimensions as directed by the Engineer
Aggregate Subbase (Trenches)	11' width

Aggregate Subbase (Services, hydrant leads, CB leads)	6' width
Aggregate Subbase (Outside Trenches)	In place dimensions as directed by the Engineer

Aggregate base temporarily used to fill the trench to finish grade before paving is considered incidental to the pipe items. Pay limits for trenches listed above also include common excavation to the width listed, payment for which is to be included in the pipe cost.

10.08 FIELD LAYOUT

The City shall provide control points once for the Contractor, if they exist. The Contractor shall establish baseline from the supplied control points. The baseline in these Specifications is for reference only to locate items and is not meant to be exact locations. GIS based plans shall be laid out by a method as directed by the Engineer. If, during the course of construction, the layout points, benchmarks, or control points are disturbed by the Contractor, it shall be his/her responsibility to re-establish their locations.

10.09 DISPOSAL OF SURPLUS MATERIAL

Existing pavement may be disposed of at the Gendron & Gendron quarry on Alfred Plourde Parkway, St. Laurent and Son pit in Sabattus or other approved location. Surplus excavation and bricks/concrete may be disposed of at the City of Lewiston dump site (quarry) on River Rd. or other approved dump site. Excavation disposed of at the City quarry or any other fill site **MUST** have ALL asphalt and asbestos pipe separated out. The tipping fee will be waived.

10.10 SHOP DRAWINGS

The Contractor shall submit either two (2) hard copies or an electronic copy of shop drawings to the Engineer for his/her review and approval, for the following materials: gravels, hot mix asphalt, catch basin/manhole frame and covers, Nutrient Separating Baffle Box, Filter Basins coir log and erosion control blanket.

10.11 SITE INVESTIGATION

The Contractor shall examine the Plans/Specifications and site of the work and from his/her own investigation, determine the nature and location of the work, the general and local conditions, particularly those bearing on access, transportation, quality and quantity of surface and sub-surface materials to be encountered, any dewatering, the machinery and services required to complete the Project as required by the Contract Documents and all other aspects of the work.

10.12 MAINTENANCE OF TRAFFIC

The Contactor shall be required to maintain one lane, in each direction, for traffic and emergency vehicles at all times. If the contractor cannot maintain traffic in each direction, the Engineer may allow one lane traffic in short sections. Completely closing traffic lanes will not be permitted except under special permission from the Public Works Director, Fire Chief, and the Police Chief. The Contractor shall install detour signs as required by the Engineer. The City shall be responsible for approving the traffic plan.

10.13 MISCELLANEOUS WORK

Performance and Payment Bonds - The Contractor shall include in his/her Proposal under the "Miscellaneous Work" item, the cost of his/her Performance and Payment Bond. The Contractor shall be paid this amount on his/her first partial payment provided that invoices substantiating the amount are submitted to the Engineer prior to payment.

Sweeping and Dust Control - The Contractor shall be responsible for controlling dust at all times by sweeping existing pavement and watering gravel roadways. Streets shall be swept and calcium chloride shall be applied to gravel daily to control dust overnight. When project and traffic conditions require, as determined by the Engineer, a water truck shall remain on site. The truck may be filled free of charge at the Public Works facility. If for any reason the Contractor does not have a water truck available and the City is forced to use a Public Works truck or other method to control dust, the Contractor will be charged a fee to be subtracted from the next pay requisition.

Temporary Soil Erosion and Water Pollution Control - This project will occur in and around Hart Brook, which is on the EPA 303(d) list of impaired water bodies. Therefore, proper erosion and sediment control practices must be used. Work under this bid item shall be done in accordance with SECTION 656 – TEMPORARY SOIL AND EROSION AND WATER POLLUTION CONTROL of the Maine Department of Transportation Standard Specifications - latest revision.

Miscellaneous - The cost of all other incidental construction work required to complete the whole work as specified or implied in the Plans and Specifications for which there is no pay item, will be paid under the "Miscellaneous Work" item. An itemized cost breakdown for the "Miscellaneous Work" item shall be given to the Engineer at the Preconstruction Conference.

10.14 SITE MAINTENANCE AND CLEAN UP

The Contractor shall maintain a neat work area at all times with all fill or other materials picked up off the street every night and the road swept. At no time during the work shall fill, tools, pipe, structures, equipment or vehicles be placed, parked or stored on private property. No vehicles or equipment shall be parked in private driveways at any time. All work shall be completed within the right-of-way unless easements or other arrangements have been made. All driveways shall be filled in sufficiently every night for property owners

to enter without damage. Homeowners shall be given adequate notice in the morning to move their vehicles before work begins in front of their driveway.

All debris resulting from the operations under this Contract and all tools and apparatus are to be removed from the site at the DAILY completion of the work and the site left clear and free from hazards, to the satisfaction of the City of Lewiston. Any equipment or materials left on the edge of the street at night shall be well barricaded with reflective barrels or barricades.

10.15 PREPARATION FOR FINAL PAVING:

All temporary pavement and gravel trenches shall be maintained by the Contractor until final pavement is placed. Trench preparation for final paving shall be performed immediately prior to final paving (no more than one day beforehand). - Remove the top layer of aggregate base placed during backfilling for the appropriate thickness of pavement. Fine grading of mainline trenches shall be completed by use of a bulldozer or grader. Trench edges at existing pavement shall be clean and loose chunks of pavement removed. Reshape and compact trench according to Div. 90.08 in preparation for final paving. No separate payment shall be made for the aggregate base material removed.

10.16 PAVING:

Streets, sidewalks and driveways shall be paved by the Contractor. Paving shall be completed according to Division 80 of these specifications.

An asphalt escalator shall apply according to MDOT spec Section 108, as attached to this Division. The equivalent MDOT Item No shall be applied (403.207, 403.208, 403.209, 403.210) and the pay adjustment shall be made at the completion of the project. The paving shall be subject to the MaineDOT Special Provision 400 – Pavements, February 12, 2013 revision.

10.17 SALES TAX:

Materials purchased for use on this project are exempt from State Sales and Use or Excise taxes to the extent allowed by law.

End of Section

DIVISION 20

GENERAL PROVISIONS

STANDARD SPECIFICATIONS

DIVISION 20

GENERAL PROVISIONS

STANDARD SPECIFICATION

20.01 SCOPE:

These Standard Specifications and Addenda, if any, are to govern construction of storm sewers, sanitary sewers, water lines, streets, sidewalks, parking lots, general construction and other related work, for the City of Lewiston, and they shall become part of any contract with the City for the construction of said work. Provisions of these Specifications shall be modified or changed only in writing. These Standard Specifications will be amended by Supplemental Specifications as necessary and by Contract Plans.

The Supplemental Specifications and Contract Plans delineate the particular project to which the Contract Documents pertain. Should any discrepancy be found to exist between the Standard Specifications and the Supplemental Specifications and/or the Contract Plans, the Supplemental Specifications and/or Contract Plans shall govern.

20.02 DEFINITIONS:

A. Contract Documents: Whenever the term Contract Documents, or a pronoun in its stead, is used, it shall mean and include, but not necessarily limited to, these items: The Notice to Contractors, the Proposal, the Contract, the Supplemental Specifications, the Standard Specifications, the Contract Plans, any other documents included with these Specifications and attached thereto, and any Addenda to the above issued prior to the date of this Contract.

B. Contractor: Whenever the term Contractor, or a pronoun in its stead, is used, it shall mean the person or persons or co-partnership or corporation or other entity which has entered into this agreement or their legal representative.

C. Owner: Whenever the term Owner, or a pronoun in its stead is used, it shall mean the City of Lewiston, acting through its designated officials and/or employees.

D. City Engineer or Engineer: Whenever the term City Engineer, or a pronoun in its stead, is used, it shall mean the City Engineer of the City of Lewiston or his/her assistants or inspector acting under him/her or his/her duly authorized representatives acting for him/her, limited to the particular duties entrusted to them.

E. Director of Public Works or Director: Whenever the term Director of Public Works, Director or a pronoun, in their stead is used, it shall mean the Director of Public Works of the City of Lewiston or his/her assistants or inspectors acting under him/her, limited to the particular duties entrusted to them.

F. ASTM: Whenever the abbreviation ASTM is used, it shall mean the American Society for Testing Materials; and, unless otherwise stated, refer to the latest revision of the particular standard.

G. Specification: Whenever the term Specifications or a pronoun in its stead is used, it shall mean and include the Standard Specifications as herein set forth and any Supplemental Specifications included in the Contract Documents.

H. Contract Plans: Whenever the term Contract Plans, or a pronoun in their stead, is used, it shall mean and include all drawings, graphic representations, diagrams and any notes or explanations thereon supplied to the Contractor before the date of this Contract.

I. Lump Sum Bid Price: Whenever the term Lump Sum Bid Price, Lump Sum Bid, Lump Sum or a pronoun in their stead is used, it shall mean the amount of money mutually agreed to by the Contractor to furnish the labor, machinery, tools, apparatus and other means of construction and for doing all the work and furnishing all material called for by the Contract Documents except rock excavation and those items specifically stated as being considered extra work or for which unit prices have been established in the Contract and Proposal.

J. Unit Bid Price: Whenever the term Unit Bid Price, Unit bid, Unit Price or a pronoun in their stead is used, it shall mean the amount of money mutually agreed to by the Contractor and the City as full payment to the Contractor for furnishing all necessary labor, materials and equipment (except that which is specifically excluded in the Supplemental and Standard Specifications and Contract Plans) necessary to do one unit of work, i.e., the unit price for one cubic yard of excavation multiplied by the actual number of cubic yards excavated, yields the total payment for the work done.

20.03 INSURANCE AND LIABILITY:

The Contractor shall take all responsibility of the work and take all precautions for preventing injuries to persons and property in or about the work; shall bear all losses resulting to him/her on account of the amount or character of the work or because the nature of the land in or on which the work is done is different from what was estimated or expected or on account of the weather, elements or other cause; and he/she shall assume the defense of and indemnify and save harmless the City and its officers, agents and servants from all claims relating to labor and materials furnished for the work; to inventions, patents and patent rights used in doing the work; to injuries to any person or corporation received or sustained by or from the Contractor and his/her employees in doing the work, or in consequence of any improper materials, implements or labor used therein; and to any act, omission or neglect of the Contractor and his/her employees therein.

The Contractor shall furnish proof of coverage with adequate insurance of the types and to the limits specified below naming the City of Lewiston as additional insured. Certificate of such insurance shall be filed with the Director of Budget/Purchasing for his/her approval before permission to commence work will be granted.

INSURANCE REQUIREMENTS

A. Claims:
The City of Lewiston will not be held responsible for any damages or injuries arising out of any activity for the City. Any related claim will be referred to the Contractor. The contractor may wish to make personal restoration within a reasonable amount of time at the property owner's satisfaction or process a claim with their insurance carrier.

B. Insurance:
The Contractor shall furnish proof of coverage with adequate insurance of the types and to the limits specified below **naming the City of Lewiston as additional insured**. Certificate of such insurance shall be filed with the Director of Budget/Purchasing by the start of work**.**

C. Workers' Compensation:
Workers' Compensation, coverage with Statutory Limits and Employers Liability for all employees with limits of $400,000 per incident; and in case any work is sublet, the Contractor shall require the sub-contractor similarly to provide coverage for the latter's employees unless such employees are covered by the protection afforded the Contractor.

D. Automotive Liability Insurance:
Automotive Liability insurance with minimum limits of liability for bodily injury in the amount of $1,000,000 for each occurrence and minimum limits of liability for property damage in the amount of $50,000/$100,000 aggregate.

E. General Liability Insurance:
General Liability insurance with minimum limits of liability for bodily injury in the amount of $1,000,000 for each occurrence and minimum limits of liability for property damage in the amount of $50,000/$100,000 aggregate, or a combined single limit of $500,000 for each occurrence, including completed operations shall be required.

F. Performance Bond and Labor and Material Payment Bond in the sum of the total amount of the Contractor's proposal with a surety company satisfactory to the Owner will be required as surety for the faithful performance of the Contract by the successful bidder. The bonds will be required prior to execution of the Contract.

20.04 DISPUTE RESOLUTION COSTS AND EXPENSES:

In the event of any dispute between or involving the City of Lewiston and Contractor, whether resolved by arbitration, litigation or some other mechanism of dispute resolution, in the event that the City shall be a prevailing party, Contractor shall reimburse the City for its attorney's fee and costs reasonably incurred in connection with the resolution of the dispute.

20.05 LAWS AND REGULATIONS:

The Contractor shall keep himself/herself informed of all existing and future State and Federal laws and Municipal ordinances and regulations which in any way affect those engaged or employed in the work, or the materials used in the work; or in any way affect the conduct of the work and of all orders and decrees of bodies of tribunals having any jurisdiction is discovered in the Plans or Specifications or Contract for this work in relation to any such law, ordinance, regulation, order or decree, he/she shall forthwith report the same to the Director in writing. He/she shall at all times himself/herself observe and comply with all such existing and future laws, ordinances, regulations, orders and decrees; and shall protect and indemnify the City and its officers and agents against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order or decree, whether by himself/herself or his/her employees.

20.06 PERMITS:

The Contractor shall, at his/her own expense, obtain all necessary permits from the County, Municipal or other public authorities, shall give all notices required by law or ordinances; and shall post all bonds and pay fees and charges incident to the due and lawful prosecution of the work covered by this Contract. Fees for street opening permits on City projects shall be waived.

20.07 ESTIMATES AND PAYMENTS:

The Engineer will, each month, make an approximate estimate of the amount of work done since the last preceding estimate and of the value thereof, and upon such estimate being made, the City will pay to the Contractor ninety (90%) per cent of the estimate; provided, however, that no such estimate or payment shall be required to be made when, in the judgment of the Engineer, the total value of the work done since the last estimate or payment amounts to less than three hundred ($300.00) dollars. Payment may at any time be withheld if the work is not proceeding in accordance with the provisions of this Contract. The Engineer may, if he/she deems it expedient so to do, cause estimates to be made more frequently than once in each month, and he/she may approve payments to be made more frequently to the Contractor. The Engineer may at his/her option retain, temporarily or permanently, a smaller amount than aforesaid, and may approve payment to the Contractor, either temporarily or permanently from time to time during the progress of the work, of such portion of the retained amount as he/she may deem prudent. The City, may keep any money which would otherwise be payable at any time hereunder, and apply the same, or so much as may be necessary therefore, to the payment of any expenses, losses, or damage incurred by the City and determined as herein; and may retain, until all claims are settled, so much of such money as the Director shall be of the opinion will be required to settle all claims against the City, its officers, agents or servants. **The City may set off any unpaid taxes, fees or other charges or other amounts owed by the contractor against the contract price, in full or partial satisfaction.**

20.08 FINAL ESTIMATE AND PAYMENT:

It is further mutually agreed that whenever, in the opinion of the Engineer and the Director, the Contractor shall have completely performed all the work embraced in this Contract, the Engineer shall proceed with all reasonable diligence to measure the work and shall make out the final estimate for the same and shall certify the same in writing; and his/her certificate shall state the whole amount of the payments previously paid and the amount retained in all previous estimates. Within the term of thirty (30) days after the date of such final estimate, the City will pay to the said Contractor the amount due. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

Provided that nothing herein contained shall be construed to affect the right of the City by its Director of Public Works hereby reserved, to reject the whole or any portion of the aforesaid work should the said certificate or certificates be found or known to be inconsistent with the terms of this Agreement or otherwise improperly given.

20.9 LAST PAYMENT TO TERMINATE LIABILITY OF CITY:

No person or corporation other than the signer of this Contract as Contractor now has any interest hereunder, and no claim shall be made or be valid; and neither the City, nor its Mayor,

nor any member or agent thereof, shall be liable for, or be held to pay any money, except as provided for in Sections 20.07, 20.08, 20.16, and 20.33 of the Standard Specifications and in the Contract. The Acceptance by the Contractor of the last payment aforesaid shall operate as and shall be a release to the City, its Mayor, and every member or agent thereof, from all claim or liability to the Contractor for anything done or furnished for, or relating to the work, or for any act or neglect of the City, or of any person relating to or affecting the work, except the claim against the City for the remainder, if any there be of the amount kept or retained as provided for in Section 20.07.

20.10 SITE INVESTIGATION:

The Contractor shall examine the Plans, Specifications and site of the work and from his/her own investigation, determine the nature and location of the work, the general and local conditions, particularly those bearing on access, transportation, quality and quantity of surface and sub-surface materials to be encountered, and all other aspects of the work, machinery and services required to complete the project as required by the Contract Documents. The City will not be responsible for any understanding or representation made by any City employee during or prior to negotiation and execution of the Contract, unless such understanding or representation shall be in writing and become a part of the Contract Documents.

20.11 BORINGS AND ESTIMATE OF QUANTITIES NOT WARRANTED:

It is expressly understood and mutually agreed to by the parties hereto that the quantities of the various classes of work to be done and materials to be furnished under this Contract have been estimated and are approximate and only for the purpose of comparing on a uniform basis the bids offered for the work. It is also understood that the Contractor has made his/her proposal from his/her own examinations and estimates and shall not hold the City, its agents or employees responsible for or bound by any schedule, estimate, sounding, boring or any plan thereof as being even approximately correct; and should the Contractor encounter quicksand or other difficulties, he/she shall have no claim on that account; and he/she shall, if any error in any plan, drawing, specification or direction relating to anything to be done under this Contract comes to his/her knowledge, report it at once to the Engineer. The Contractor further agrees that neither the City of Lewiston, nor the Director of Public Works, the Engineer, nor either of them separately or together are to be held responsible that any of the quantities be found even approximately correct in the construction of the work, and that the Contractor will make no claim for anticipated profits or for loss of profit because of a difference between the quantities of the various classes of work actually done, or of the materials actually delivered, and any estimated quantities stated in the bids. The Contractor hereby agrees that he/she will complete the entire work to the satisfaction of the Engineer and in accordance with the Specifications and Plans herein mentioned and at the prices agreed upon and fixed therefore.

20.12 COMMENCEMENT OF WORK:

The Contractor agrees to commence the work required in the Contract Documents within ten (10) days after the signing of the Contract and deliverance of the Bond, unless otherwise specified in the Supplemental Specifications or directed by the Director of Public Works; and at his/her own cost and expense do and complete all the work and furnish all the labor, machinery, tools and materials, except as specified in the Supplemental Specifications, and to do everything required

to build and put into complete working order for the City of Lewiston the work described in the Contract Documents.

20.13 TIME AND ORDER OF DOING WORK:

The Contractor agrees that the work shall be commenced and carried on at such points and in such order of precedence and at such times and seasons as may from time to time be directed by the Engineer.

It is further agreed that no work shall be done under this Contract on Saturdays or Sundays or on days declared by the State Legislature as Legal Holidays, except in cases of emergency and then only with the consent in writing of the Director of Public Works; nor shall any work be done at night unless authorized in writing by the Director. The Contractor shall make his/her work week conform to that of the Public Works Department. When permission is granted to perform work during times other than this work week, the Contractor shall reimburse the City for any costs for inspection during these periods.

20.14 NO DAMAGES FOR DELAY:

The Director may delay the beginning of the work or any part thereof if the City shall not have obtained possession of the land in or upon which the same is to be performed or if for any other reason it becomes necessary to do so. The Contractor shall have no claim for damages on account of such delay, but shall be entitled to so much additional time wherein to perform and complete this Contract on his/her part as the Director shall certify in writing to be just. Whenever any part of the work covered by this Agreement is done in part by or connects with the work so as to accommodate the work of the other contractors and to cooperate with such contractors in mutual agreements as to all such work, and no contractor shall have a claim against the City growing out of the negligence or delay of any other contractor or contractors; but each contractor shall be liable to every other contractor for any such delay or negligence.

20.15 COMPETENT PERSONNEL TO BE EMPLOYED:

The Contractor shall employ only competent personnel to do the work; and whenever the Director shall notify the Contractor, in writing, that any person on the work is, in his/her opinion, incompetent, unfaithful, disorderly or otherwise unsatisfactory, such person shall be discharged from the work and shall not again be employed on it except with the consent of the Director.

A person certified by the DEP in erosion control best practices must be on-site for any activity that disturbs more than one cubic yard of soil –including earth moving and landscaping operations in the shoreland zone until work is complete and the site stabilized.

20.16 NOT TO SUBLET OR ASSIGN:

The Contractor shall give his/her personal attention constantly to the faithful prosecution of the work, shall keep the same under his/her personal control and shall not assign, by power of attorney or otherwise, nor sublet the work or any part thereof, without the previous written consent of the Director; and shall not, either legally or equitably, assign any of the money payable under this Agreement or his/her claim thereto, unless by and with the like consent of the Director.

20.17 DIRECTIONS AND EXPLANATIONS, CORRECTIONS OF ERRORS:

The Plans and Specifications are understood to be explanatory of each other, but should any discrepancy appear or any misunderstanding arise as to the import of anything contained in either of them, the parties hereto further agree that the explanation and decision of the Engineer shall be final and binding on the Contractor; and all directions or explanations required or necessary to complete any of the provisions of this Contract and these Specifications and give them due effect shall be given by the Engineer. Correction of any error in the Plans or Specifications may be made by the Engineer, when such correction is necessary for the proper fulfillment of the intention of such Plans or Specifications, the effect of such correction to date from the time that the Engineer gives due notice in writing to the Contractor.

20.18 DUTY TO NOTIFY ENGINEER IF AMBIGUITIES DISCOVERED:

The Contractor shall not take advantage of any ambiguity, error, omission, conflict, or discrepancy ("ambiguity, etc.") contained in the Plans and Specifications that may significantly affect the cost, quality, conformity, or timeliness of the work. If the Contractor discovers any such ambiguity, etc., for which the Contractor may seek adjustments to compensation, time, or other Contract requirements, the Contractor shall provide a written notice stating the nature of the ambiguity, etc. within forty eight (48) hours of discovering or being notified of the ambiguity and before performing any work related to the ambiguity, etc., as provided in Section 20.19 – Early Negotiation. Failure to provide such written notice in compliance with the Contract shall constitute a waiver of all claims related to the ambiguity, etc.

20.19 EARLY NEGOTIATION:

A. Notice Required: When the Contractor becomes aware of facts or circumstances that may cause the Contractor to seek additional compensation, time, or any other change in the requirements of the Plans and Specifications ("Issue"), then the Contractor shall notify the Engineer in writing within forty eight (48) hours of identification of the issue and at least 48 hours before commencing any part of the Work relating to the Issue. The notice must describe the basic nature and extent of the Issue.

Such notice may be verbal only if confirmed in writing in one of the two following ways: (A) if a Progress Meeting is held within fourteen (14) days of the date that the Issue became known, such Notice may be confirmed with an entry in the Progress Meeting minutes. Such entry must describe the basic nature and extent of the Issue. (B) Otherwise, the Contractor shall confirm a verbal notice by delivering to the Engineer, within fourteen (14) days of the date the Issue arose, a Written Notice that describes the basic nature and extent of the Issue.

The written notice or confirmation will be known as a "Notice of Issue for Consideration". The Contractor will not be entitled to any additional compensation, time, or any other change to the requirements of the Plans and Specifications without a timely Notice of Issue for Consideration.

B. Negotiation: When the Engineer receives the Notice of an Issue for Consideration conforming to Section 20.19 A. Notice Required, the Engineer and the Contractor will negotiate in good faith to attempt to resolve the Issue. Any resolution will be noted in the Progress Meeting minutes or confirmed otherwise in writing by the Engineer. Any changes to the Plans and

Specifications that affect compensation, time, quality, or other requirements of the Plans and Specifications shall be by written Change Order.

20.20 SUPERINTENDENCE BY CONTRACTOR:

At the site of the work, the Contractor shall employ a construction superintendent or foreman who shall have full authority to act for the Contractor. It is understood that such representative shall be acceptable to the Engineer and shall be one who can be continued in that capacity for the particular job involved unless he/she ceases to be on the Contractor's payroll. All directions given to such representative in the Contractor's absence shall be as binding as if given to the Contractor.

20.21 ALTERATIONS:

It is further agreed that the Engineer may make alterations in the line, grade, form, position, dimension or material of the work herein contemplated, or any part thereof, either before or after the commencement of the work; and that the Director may at any time, order an alterations increase in the amount of work. Such increase shall be paid for according to the quantity actually done as extra work as provided for in Section 20.29. If such alterations diminish the quantity of work to be done, they shall not constitute a claim by the Contractor for damages or for anticipated profits on the work dispensed with and payment will be reduced in an amount determined as provided for in Section 20.30.

20.22 NO CITY EMPLOYEE TO BE INTERESTED:

It is further agreed that this Contract shall be utterly void as to the City if any person employed in any capacity by the City of Lewiston is either directly or indirectly interested therein, except as provided by the City Charter.

20.23 WAIVER:

No order by the Inspector or the Engineer or any of his/her employees, nor any order, measurement or certificate by the Engineer, nor any order by him/her for the payment of money, nor any payment for, or acceptance of, the whole or any part of the work by the Director, nor any extension of time, nor any possession taken by the Director or his/her employees, shall operate as a waiver of any provision of this Contract, or of any power herein reserved by the Director, or of any right to damages herein provided; nor shall any waiver of any breach of this Contract be held to be a waiver of any other or subsequent breach. Any remedy provided in this Contract shall be taken and construed as cumulative, that is, in addition to each and every other remedy herein provided and the City and the Director shall also be entitled to a writ of injunction against any breach of any of the promises of this Contract.

20.24 ACCESS TO WORK:

The Engineer and Director, their assistants and inspectors may, for any purpose, enter upon the work and premises used by the Contractor, and the Contractor shall provide safe and proper facilities therefore. Other City contractors may also, for all the purposes which may be required

by their contracts, enter upon the work and premises used by the Contractor. Any difference or conflicts which may arise between the Contractor and other contractors of the City in regard to their work shall be adjusted and determined by the Director.

20.25 ENGINEER TO DETERMINE AMOUNT AND QUANTITY OF WORK, INSPECTION OF MATERIALS:

To prevent all disputes and litigations, it is hereby agreed by and between the parties to this Contract that the Engineer shall in all cases determine the amount and quality of the various classes of work which are to be paid for under this Contract; and that the Engineer by himself/herself, or his/her representatives acting under him/her, shall inspect all the materials to be furnished and all work to be done under this Contract to see that the same corresponds to the Specifications herein set forth. The Contractor further agrees that he/she will furnish the Engineer with such information and vouchers relating to the work, the materials therefore, and the persons employed thereon, as he/she shall from time to time request, and will give to the Engineer or his/her representatives all necessary labor, tools and facilities for inspecting the material to be furnished and the work to be done under this Contract.

The Engineer has the authority to stop the work whenever such a stoppage may be necessary to insure proper execution of this Contract. He/she also has the authority to reject all work and materials which do not conform to the Specifications or Plans, to direct application of forces to any portion of the work and to order the force increased or diminished as in his/her judgment is required.

20.26 DEFECTIVE WORK AND MATERIALS:

The inspection of the work shall not relieve the Contractor of any of his/her obligations to fulfill this Contract as herein prescribed and defective work shall be made good and unsuitable materials may be rejected, notwithstanding that such work and materials have been previously overlooked by the Engineer and accepted or estimated for payment. If the work or any part thereof shall be found defective at any time before the final acceptance of the whole work, the Contractor shall forthwith make good such defect, in a manner satisfactory to the Engineer, and if any materials brought upon the ground for use in the work, or selected for the same, shall be condemned by the Engineer as unsuitable or not in conformity with the Specifications, the Contractor shall forthwith remove such materials from the vicinity of the work. Nothing in this Contract shall be construed as vesting in the Contractor any right of property in the materials used after they have been attached or affixed to the work or the soil; but such materials shall, upon being so attached or affixed, become the property of the City.

20.27 SANITARY REGULATIONS:

Necessary sanitary conveniences for the use of laborers on the work, properly secluded from public observation and made fly proof and satisfactory to the Health Officer, shall be constructed and maintained by the Contractor in such a manner and their use shall be strictly enforced. The building or shanties or other structures for housing and personnel will be permitted only at such places as the Director shall approve and the sanitary conditions in or about such shanties or other structures must at all times be maintained in a manner satisfactory to the Director.

20.28 NO INTOXICATING DRINKS:

The Contractor shall neither permit or suffer the introduction or use of intoxicating substances upon or about the works embraced in this Contract or upon any grounds occupied by him/her.

20.29 EXTRA WORK:

The City of Lewiston reserves the right to add portions of the work required under this Contract, using the unit prices established in the proposal. The City will determine if all work outlined in the plans or portions thereof shall be built under this Contract prior to the Contact signing.

The term Extra Work as used herein refers to and includes work required by the City which, in the judgment of the Director, involves changes in or additions to that are required by the Plans and Specifications; provided, however, such changes or additions do not result from the fault of the Contractor.

The Contractor shall do any extra work when and as ordered in writing by the Director or his/her agents specially authorized thereto in writing, and shall, when requested by the Director so to do, furnish itemized statements of cost of the extra work ordered and give the Director access to the accounts, bills and vouchers relating thereto. If the Contractor claims compensation for extra work not ordered as aforesaid, or for any damage sustained, he/she shall, within one week after the beginning of any such work or of the sustaining of any such damage, make a written statement to the Engineer of the nature of the work performed or damage sustained and shall, on or before the fifteenth (15th) day of the month succeeding that in which any such extra work shall have been done or any such damage sustained, file with the Engineer an itemized statement of the details and amount of such work or damage; and unless such statements shall be made as so required, his/her claim for compensation shall be forfeited and invalid and he/she shall not be entitled to payment on account of such work or damage. The determination of the Engineer and Director shall be final upon all questions of the amount and value of extra work. If a unit price does not exist, payment for extra work will be actual cost plus fifteen (15%) per cent. For work performed by subcontractors, payment shall be the subcontractors actual cost plus 15%, plus an additional 5% for the Contractor's oversight. No allowance will be made for overhead costs.

20.30 REDUCTION OF WORK:

The City of Lewiston reserves the right to delete portions of the work required under this Contract, using the unit prices established in the Proposal. The City will determine if all work outlined in the Plans or portions thereof shall be built under this Contract prior to the Contract signing.

The Contractor shall omit and not perform any portion of the work required by the Contract Documents when ordered in writing by the Director or his/her agents specially authorized thereto in writing. If no unit price exists, it will be an estimate to be made by the Director and the Engineer. Their estimate will be final and binding. These reductions shall not constitute a claim by the Contractor for damage or for anticipated profit on the work dispensed with.

20.31 NO TIME EXTENSION:

The Contractor further agrees that the time of completion of the whole work is the essence of the Contract; and that he/she will make every effort to complete the work within the time limit

specified in the Supplemental Specifications. In the event the Contractor fails to complete the whole work in the time specified, there shall be deducted from monies due the Contractor, not as a penalty, but as inspection costs, the sum of five hundred ($500.00) dollars for each working day, over and beyond the time limit specified which is required by the Contractor to complete the whole work to the satisfaction of the Engineer and the Director. No extension of the time limit will be considered except in the case of an extremely unusual circumstance beyond the control of the Contractor. Any time extension will be authorized only in writing by the Engineer and Director; in which case the inspection cost charges will begin on the first working day after the extended time limit.

20.32 EMPLOYMENT OF LABOR:

The Contractor agrees that in the employment of labor, preference will be given, all things being equal, to citizens of Lewiston, the State of Maine and the United States in their respective order as above noted.

20.33 CONDITIONS UNDER WHICH DIRECTOR MAY COMPLETE WORK:

The Contractor hereby agrees that if the work to be done under this Contract shall be abandoned or if this Contract or any part thereof shall be sublet without the previous written consent of the Director, or if the Contract or any claim thereunder shall be assigned by the Contractor otherwise than as herein specified, or at any time the Director shall be of the opinion that the work is unnecessarily or unreasonably delayed, or that the Contractor is willfully violating any of the conditions or agreements of this Contract, or is not executing the Contract in good faith, or is not making such progress in the execution of the work as to indicate its completion within the required time, the Director shall have the power and right to notify the Contractor to discontinue all work or any part thereof under this Contract. Thereupon the Contractor shall discontinue the work or any such parts thereof as the Director shall have the power, by contract with or without advertising, day labor or otherwise as he/she may determine, to employ such labor and obtain such tools and appliances as he/she may deem necessary to work at and be used to complete the work herein described or such parts thereof as the Director may deem necessary, and to use such tools and materials of every description as may be found upon the line of work, and to procure other materials for the completion of the same, and to charge the expense of said labor, tools and materials to the Contractor; and the expense so charged shall be deducted and paid by the City out of such monies as may be due or may become due the Contractor under this Contract or any part thereof. In case such expense is more than the sum which would have been payable under this Contract, if the same had been completed by the Contractor, then the Contractor shall pay the amount owed by the City under this Contract at the time the Contractor is notified in writing to discontinue the work or any part thereof, plus the amount of the Bond executed by the Contractor for the performance of the Contract.

20.34 PAYMENT FOR MATERIALS:

Payments will be made in accordance with the price stated in the Contract. The Contractor may include requests for payment of material delivered to the job site when such requests are accompanied by invoices substantiating the requests for material payment satisfactory to the City.

20.35 GUARANTEE:

The Contractor guarantees that the work to be done under this Contract will be done in a good and workmanlike manner and all materials, whether furnished by him/her or the City used in the construction of the work, will be free from defects and flaws and in conformity with the Plans and Specifications in all respects. This guarantee will be for a period of one (1) year after the date of acceptance of the whole work by the City of Lewiston.

The Contractor shall at all times, until the final acceptance of the whole work, keep the surface of the streets in the position and condition required by these Plans and Specifications. If at any time within the period of the guaranty, any other part of the work constructed under the terms of this Contract shall in the opinion of the Director of Public Works require repairing, the Director shall notify the Contractor in writing to make the required repairs. If the Contractor shall neglect to make such repairs to the satisfaction of the Director within the time limit as set forth in the notice in writing to the Contractor of the required repairs, then the Director of Public Works may make the necessary repairs, by contract or otherwise, and the City shall have a claim against the Contractor in the amount of the expense incurred by the City in making such repairs.

It is hereby, however, specifically agreed and understood that this guaranty shall not include any repairs made necessary by any cause or causes other than defective work or materials.

20.36 WORK DAY:

A work day shall be any day, other than a State of Maine legal holiday, Saturday or Sunday, on which weather and working conditions permit the Contractor to make effective use of not less than seventy-five (75%) per cent of the hours during the regular work day. In the event the Contractor is granted permission to engage in work on a legal holiday or Sunday, such a day will be considered and counted as a work day.

End of Section

DIVISION 30

CONTROL OF WORK

STANDARD SPECIFICATIONS

Content

DIVISION 30

CONTROL OF WORK

STANDARD SPECIFICATIONS

30.01 SCOPE

This division shall insure that the work progresses in a reasonable manner, and that the project site is maintained so as to provide safe traffic flow for vehicles and pedestrians, and present a neat and orderly appearance.

30.02 REFERENCES

This division references the following documents. In their latest revision, they form a part of this specification to the extent specified herein. In case of conflict, the requirements of this specification shall prevail.

AASHTO M144 Standard Specification for Calcium Chloride

30.03 PLANT

The Contractor shall furnish plant and equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress which will insure the completion of the work within the time stipulated in the Specifications. If at any time such plant appears to the Engineer to be inefficient, inappropriate or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, the Engineer may order the Contractor to increase the efficiency, change the character or increase the plant equipment, and the Contractor shall conform to such orders. Failure of the Engineer to give such orders shall in no way relieve the Contractor of his/her obligations to secure the quality of the work and rate of progress required.

30.04 OPEN EXCAVATIONS

All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. Warning signs, barricades, and traffic cones shall meet the latest OSHA standards, Manual on Uniform Traffic Control Devices (MUTCD) and all other applicable Federal, State, and local requirements. The Contractor shall, at his/her own expense, provide suitable and safe bridges and other crossings for accommodating pedestrian travel. Bridges provided for access to private property during construction shall be removed when no longer required.

The length of any open excavation shall not exceed fifty (50) linear feet, unless authorized by the Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as limiting the length of open excavation, prohibiting the stacking of excavated material in the street, and/or requiring that the excavation shall not remain open overnight. The Contractor shall hold the City harmless from all liability related to open excavations.

Open excavations will be allowed overnight, except they shall be backfilled for weekends, when they are within fifty (50) feet of an intersection, or if they present a hazard to traffic as determined by the Engineer.

The Contractor shall take precautions to prevent injury to the public due to open excavations. All excavations, excavated material, equipment, or other obstacles that could be dangerous to the public shall be well lighted at night. Open excavations shall be allowed overnight, except on heavily traveled streets, or when ordered by the Engineer.

30.05 MAINTENANCE OF TRAFFIC

The Contractor shall perform his/her work to maintain at least one lane available for the use of traffic and emergency vehicles at all times. Completely closing the traffic lanes will not be permitted except under special permission from the Director of Public Works, Fire Chief and the Police Chief. As the work progresses, the Contractor shall maintain the street to its original width, by removing stockpiles of earth, maintaining trenches at street grade, and providing adequate drainage.

Stockpiling materials in the adjacent travel lane shall not be permitted even in situations where the contractor is granted permission to close the roadway. The contractor shall maintain the adjacent travel lane in such a manner that it can be immediately opened for emergency vehicles, busses, garbage trucks, and other vehicles requiring access to the neighborhood.

Detours around the construction site shall be subject to the approval of the Director of Public Works and the Lewiston Police Department. Where detours are permitted, the Contractor shall supply his/her own barricades and signs as approved by the Engineer. In order to avoid delays in construction, any proposed plan to detour traffic shall be presented to the Engineer, in writing, five workdays in advance so that the plan may be reviewed and approved by the City Engineer.

Additional warning signs shall be placed in other streets as necessary to maintain proper traffic control, especially for detours, or where existing traffic patterns will be altered. Additional flaggers, signs, barricades, cones, etc., may be required in the work area.

Overnight parking of construction equipment within ten (10) feet of the travel way of a City street will not be allowed without permission from the Engineer.

The Lewiston Police Department and Lewiston Fire Department shall be notified by the Contractor prior to any work being done in major intersections.

All work shall be done in accordance with SECTION 652 - MAINTENANCE OF TRAFFIC of the Maine Department of Transportation Standard Specifications - latest revision.

30.06 CARE AND PROTECTION OF PROPERTY

During construction, the Contractor shall, at his/her own expense, provide for the use of sewers, drains, and natural drainage interrupted by his/her work, and immediately cart away and remove all offensive material, as required or directed by the Engineer.

The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, including poles, signs, services to buildings, gas pipes, water pipes, hydrants, sewers, drains, and electric and telephone cables, whether or not they are shown on the Plans. The Contractor, at his/her own expense, shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's operations shall be repaired by him/her at his/her expense.

The Contractor shall restore all ground surfaces outside the limits of construction that are damaged or disturbed by his/her operations, to their original condition. Branches, limbs, and roots shall not be cut except by permission of the Engineer. All cutting shall be smoothly and neatly done without splitting or crushing. In case of cutting or unavoidable damage to branches, limbs, and trunks of trees, the cut or damaged portions shall be neatly trimmed and covered with an application of grafting wax or tree healing paint, as directed.

Cultivated hedges, shrubs, and plants that might be damaged by the Contractor’s operations shall be protected by suitable means, or shall be dug up and temporarily replanted and cared for. After the construction operations have been substantially completed, they shall be replanted in their original positions and cared for until growth is re-established. If cultivated hedges, shrubs and plants are injured to such a degree as to affect their growth or diminish their usefulness, they shall be replaced by items of kind and quality at least equal to that existing at the commencement of work. This work shall be performed at the expense of the Contractor. All work shall be inspected and approved by the City Arborist, and it shall not be considered complete until the Contractor has completed all work to his/her satisfaction.

The Contractor shall preserve all property pins and monuments which are located outside the work area. If property pins or monuments are encountered in the work area where side slopes extend to or beyond the right-of way line, the Contractor shall halt work in the immediate area long enough for the Engineer to take such data as necessary to re-establish the location of the pin or monument. The Engineer will reset such pin or monument after completion of the work at no expense to the Contractor. If, however, pins or monuments outside the work area become damaged or lost, the restoration or replacement of such items shall be done by a licensed surveyor and shall be the Contractor’s responsibility.

The cost of replacing or repairing damaged or broken fences, steps, mailboxes, shrubs, hedges, etc., will be considered incidental to the project and no payment will be made to the Contractor for this work. Resetting of mailboxes to new road elevations shall be considered incidental to the construction and no payment will be made for this work.

On paved surfaces, the Contractor shall not use or operate tractors, bulldozers, or other equipment that could damage such surfaces. All surfaces, which have been damaged by the Contractor’s operations, shall be restored to the condition at least equal to that in which they

were found immediately prior to the beginning of operations. Suitable materials and methods shall be used for such restoration and shall be performed at the expense of the Contractor.

30.07 DUST CONTROL

This work shall consist of furnishing and applying water or calcium chloride on the roadway or haul roads for dust control as directed by the Engineer. When no items for dust control are included in the Contract, such work shall be considered incidental to the Contract.

The water shall not be salt or brackish and shall be free from oil, acid, and injurious alkali or vegetable matter. The calcium chloride shall conform to the requirements of AASHTO M144 latest version.

Water shall be applied by approved methods and equipment including a tank with a gauge-equipped pressure pump and a nozzle-equipped spray bar. Calcium chloride shall be applied by mechanical spreaders or by hand at the rate designated. Calcium chloride shall be used when authorized by the Engineer for controlling dust on the roadway under construction and where dust constitutes a hazard to traffic.

Water shall be applied to the roadway daily or as required to maintain the dust on the roadway. It may become necessary for the contractor to provide a water truck dedicated to the project if the conditions warrant. If the Contractor is unable to maintain dust on the roadway, work will cease on the project until the site can be stabilized, at which time construction may resume.

30.08 DISPOSAL OF WATER

The Contractor shall not be allowed to dispose of any water encountered or used during construction by discharging said water to any existing or new sanitary sewer or combined sewer unless expressly authorized by the Engineer.

30.09 REMOVAL OF SURPLUS EXCAVATION

As the work progresses, all surplus excavation, rubbish, refuse and all unused material, tools and equipment shall be removed at once so as to confine the new work to as short a length as is practicable. All surplus material shall be removed by the Contractor at his/her own expense unless otherwise directed in the Supplemental Specifications.

When this clearing of surplus excavation, rubbish, repairing of street surfaces, fences or other damage is neglected, the Director of Public Works will give notice, in writing, to that effect to the Contractor; and, if said material is not removed, or if said repairing is not done within forty-eight (48) hours thereafter, or if the Contractor does not at once take the necessary precautions to insure the safety of travel, the Director of Public Works may employ other parties to do such work, and the expense thus incurred will be deducted from any monies due or that may become due the Contractor. Upon the completion of the work, the Contractor shall tear down and remove all structures built by him/her and shall remove all rubbish of any kind from any street or grounds which he/she has occupied and shall leave the area of work in a neat and clean condition.

30.10 MATERIALS SUPPLIED BY THE CITY

The Contractor shall, at his/her own expense, convey all materials supplied by the City from the points where they are delivered by the City and shall, at his/her own expense, store the same in the vicinity of the work; and also, at his/her own expense, do all hauling and conveying to other portions of the work all surplus materials. He/she shall furnish, without special charge therefore, such labor and equipment as is needed to unload materials; and when the work is done in traveled ways, shall cause said materials to be neatly and securely piled so that they shall be of as little inconvenience as possible to public travel and to the occupants of adjoining property. Upon the completion of the work, the Contractor shall, at his/her own expense, transport all unused materials, supplies, tools or property furnished by the City to the location as directed by the Engineer.

The contractor shall review all materials delivered by the City or the City's supplier at no additional cost to the City. Any discrepancies between delivered materials and the quantities listed on the invoices shall be brought to the attention of the person delivering the materials and the Engineer shall be notified immediately of the discrepancy.

The Contractor shall be responsible for all loss of or damage done to materials furnished by the City from the time of delivery until the final acceptance of the completed work. All such materials lost, injured, spoiled, or, in the opinion of the Engineer, rendered unfit for use through the negligence or carelessness of the Contractor, his/her agents or employees, shall be replaced or made good in their full value to the City by the Contractor.

30.11 BLASTING PRECAUTIONS

When rock is to be removed by blasting, all blasts shall be suitably covered with mats chained together and every precaution taken for the protection of the work, adjacent utilities, traffic, adjacent buildings and other property. No blasting shall be done by any person or persons other than those approved for that purpose, nor shall any blasting be done without taking out a permit for the same stating the location where the blasting is to be done.

All explosives shall be stored in accordance with the laws and ordinances relating thereto and in accordance with and to the satisfaction of the Fire Chief. All explosives shall be brought upon the work only as needed and in small quantities. Exploders shall be kept entirely separate from explosives. The precautions against accident by blasting or premature explosions shall be entirely satisfactory to the Director of Public Works. No blasting of rock will be permitted within twenty (20) feet of the work already finished, except as permitted by the Engineer. Blasts shall be made only between such hours as are approved by the Director. All Federal, State, and City regulations relating to blasting and explosives shall be fully complied with.

30.12 DAMAGE BY BLASTING

The Contractor shall be liable for all damage to persons or property caused by blasting or explosions, or arising from neglect to properly guard and protect the excavations and all portions of the work; and the Contractor shall wholly indemnify the City against claims on

such account and no compensation will be allowed the Contractor in any event or under any circumstances for loss incurred by him/her or arising from blasting.

30.13 PRIVATE LAND

The Contractor shall not, except after written consent from the proper parties, enter or occupy with personnel, equipment or materials, any land outside the limits of the City Right of Way (R.O.W.) or location in which the work is to be done. The Contractor shall, whenever so required by the Director, erect and maintain fences along the roadways and around the grounds occupied by him/her of such character as will be sufficient for the protection of the adjoining property. The Contractor shall have access to the project only at such points as the obtained easements meet streets accepted by the City of Lewiston and at such other points that the Engineer may designate. If other points of access are desired by the Contractor, he/she shall obtain the necessary permission from the property owners.

30.14 TEMPORARY BRIDGES OR CROSSINGS, AND PRECAUTIONS

Whenever it is necessary to cross roads, paths, drives, walks or railroads, unless otherwise herein specified, the Contractor shall, at his/her own expense, provide suitable and safe bridges or other sufficient crossings for the accommodation of the public; and shall maintain the same in good and safe condition until the original condition can be restored, at which point he/she shall remove all bridges and other temporary expedients, and restore such roads, etc., to a condition satisfactory to the Engineer and/or Director of Public Works. The Contractor shall give reasonable notice to the owners of utilities, railroads and private ways before interfering with them, and in the case of railroads, shall not enter upon their location nor make any excavation therein until he/she has notified said railroad of his/her intentions to enter upon and to cross said railroad location and has received permission from the appropriate railroad representative, unless ordered otherwise by the Director of Public Works. The Contractor shall provide watch persons, lights and fences at his/her own expense, and take such other precautions as may be necessary to protect life and property; and shall be liable for all damage occasioned in any way by his/her act or neglect, or that of his/her agents, employees or personnel. When any street or way is closed to travel, suitable signs shall be furnished, placed and maintained by the Contractor at such points as shall be designated by the Director of Public Works. When the existing access to property is cut off by the Contractor, he/she shall provide proper means of access to said property and, if the work is being done in a street, alley, or place that has to be closed to vehicular travel, the Contractor shall arrange for the removal of waste, etc. and shall furnish labor for carrying fuel, supplies, etc. to points of destination, wherever required, at his/her own expense, during the time said street is closed to travel.

30.15 WORK TO BE DONE

The Contractor is to make the requisite excavations for the work and associated structures; to cut and remove all necessary brush, trees, stumps, etc., to do all ditching, diking, pumping, bailing, draining, and laying of underdrain if required; to dispose of all water from any source, including diversion of brooks; to do all sheeting, shoring, bracing and supporting and all fencing; to do all lighting and watching; to make all provisions necessary to maintain and to

protect buildings, fences, pipes, sewers, culverts, conduits, railways, and other structures, and repair all damage done to such structures; to provide bridges, fences, and other means of maintaining travel on accepted streets or roads and on streets, roads, paths, or rights-of-way in which the trenches are excavated, wherever the Director of Public Works or Engineer may direct; to construct all foundations, all brick, concrete, stone and timber work; to set in place all ironwork; to build all roadways, refill and resurface all trenches; to clear away all rubbish and all surplus material required by the Contract Documents; and to furnish all the materials, except as specified in the Supplemental Specifications, all tools, equipment and labor required to build and put in complete working order the work herein specified.

30.16 CLEANING UP

The Contractor shall keep the work area free from accumulations of waste material or rubbish. Upon completion of the work, the work area and all other areas used by the Contractor shall be cleared of all temporary structures, waste material or rubbish of any kind.

End of Section

DIVISION 40

STRUCTURAL EARTH WORK

STANDARD SPECIFICATIONS

Contents

DIVISION 40

STRUCTURAL EARTH WORK

STANDARD SPECIFICATIONS

40.01 SCOPE

This division shall govern structural earthwork for sanitary sewers, storm sewers, underdrains, water lines and their related structures, to include cutting of pavement, trench excavation, structural rock excavation, bedding and cover, backfill, extra excavation and restoration of surface.

40.02 REFERENCES

Not used.

Related Specifications
Division 50 Materials

40.03 DEFINITION

Structures include but are not limited to: culverts, catch basins and leads, manholes, end walls, sanitary sewers, storm sewers, water lines, water services, sewer services, gas services, electrical services, telephone services, underdrains, cellar drains, and hydrants.

40.04 UTILITIES

The Contractor should be aware that utility mains and services may exist in the work area. Approximate location of these utilities will be marked in the field by the respective utility company. The approximate locations of known utilities are indicated on the Plans. However, the Contractor will be responsible for determining the exact location and elevation of all utilities and services in the work area. It will be the responsibility of the Contractor to excavate and expose any utility or service if directed by the Engineer so that the true elevation of the utility can be accurately determined. The minimum clearance between the new work and any existing utility shall not be less than six (6) inches unless otherwise approved by the Engineer. Any utility main, which the Engineer deems necessary to be moved or relocated, shall be moved or relocated by the utility company at the cost of the Contractor.

Damaged sewer services, or sewer services which need to be re-laid, shall be repaired and/or re-laid by the Contractor, at the expense of the Contractor, with the use of repair couplings and the required size pipe to match existing pipe. Sewer pipe as outlined in Division 50 shall be used. All edges of pipe shall be cut square. All repair couplings used shall be approved by the Engineer.

40.05 CUTTING OF PAVEMENT

When excavations are to be made in paved surfaces, the pavement shall be cut ahead of the excavation by means of power-driven or other suitable tools to provide a clean, uniform edge

with minimum disturbance of the remaining pavement. If the edge becomes damaged during excavation, it shall be re-cut as directed by the Engineer at no additional cost to the City.

40.06 DISPOSAL OF SURFACE MATERIALS

Prior to beginning excavations, the Contractor shall remove all unsuitable surface materials, such as broken pavement, brick, curbstone, broken stone, gravel, loam, etc. Usable material shall be stockpiled at the job site as directed by the Engineer. Unsuitable material shall be removed from the job site and disposed of, in accordance with applicable laws, by the Contractor. Other material, as directed by the Engineer, which remains the property of the City shall be transported to Public Works Department storage areas, by the Contractor.

40.07 STRUCTURAL EXCAVATION FOR PIPES

The trench in which the pipe line and its foundation are to be constructed shall be excavated to the width and depth shown on the Plans or as the Engineer may direct. Excavations shall be of a width and depth adequate for removal of all material within the excavation limits shown on the Plans, for pumping and draining water, for bracing and supporting the trench walls, for the installation of sheeting and bracing where necessary, for the proper installation and compaction of all foundation and bedding materials, and for the installation and jointing of the pipe.

Excavation of material unsuitable for foundations, below the limits shown on the Plans, shall be made wherever and to the extent directed by the Engineer. In the case of excavation for concrete foundations, the trench shall be excavated to the exact form and size of the foundation as shown on the Plans. If the Contractor fails to limit the excavation of the trench, as herein specified or ordered, or if by reason of cave-ins, a greater width or depth of trench than required is obtained, then, in addition to the requirements of the following paragraph, the Contractor shall furnish and place, at his/her own expense, forms satisfactory to the Engineer for the construction of the concrete foundations as shown on the Plans; and shall, in the case of granular foundations, furnish, place and compact, at his/her own expense, all material in excess of that required by the Engineer. In the case of timber foundations, the excavation shall be as shown on the Plans. The lengths of trench to be opened and length of public street rendered unfit for travel, at any time, due to the work of the Contractor, shall conform to the requirements of the Engineer.

Sheeting or shoring will be required by the Engineer if he/she deems it necessary to keep the trench width within the allowable limits. Such sheeting or shoring shall be at the sole expense of the Contractor and he/she shall not have a claim for extra payment for this item, except as provided for in Section 40.14, Sheet and Bracing. The prevention of slides and cave-ins shall be the responsibility of the Contractor. Any damage, injury, or expense resulting from cave-ins or slides shall be at the sole expense of the Contractor.

40.08 STRUCTURAL EXCAVATION FOR STRUCTURES OTHER THAN PIPES

All excavations for structures shall be made to the width and depth shown on the Plans or as the Engineer may direct; and that will, in his/her judgment, give ample room for the building of the structures they are to contain and for all excavation necessary for the construction of foundations, pumping and draining of water, the installation of sheeting and bracing, form work, etc., as may be required.

Excavation of material unsuitable for foundations, below the limits shown on the Plans, shall be made wherever and to the extent required by the Engineer. Excavation for concrete foundations shall be made to the exact form and size of the foundations. If the Contractor fails to limit the excavation to the size specified or ordered; or if by reason of cave-ins, a greater width or depth of excavation than required is obtained, then the Contractor shall furnish and place, at his/her own expense, forms satisfactory to the Engineer for the construction of the concrete foundations as shown on the Plans; and shall, in the case of granular foundations, furnish, place and compact, at his/her own expense, all foundation material in excess of that required by the Engineer.

40.09 EXTRA STRUCTURAL EXCAVATION

Excavation below the limits shown on the Plans shall be made by the Contractor when ordered by the Engineer and shall conform to Sections 40.06, 40.07 and 40.08.

40.10 STRUCTURAL ROCK EXCAVATION

When rock is encountered in the excavation it shall be uncovered and, after it has been measured by the Engineer, it shall be taken out to a depth of eight (8) inches below the lowest point of the outside of the barrel of the pipe and of such width as shall give a continuous clearance of at least twelve (12) inches on either side of the pipe, underdrain, house service or other structure; except when a concrete foundation is used it shall afford at least sufficient width for the concrete foundation. Only such rock which, in the opinion of the Engineer, requires blasting for its removal will be measured as rock excavation. All solid rock and detached rock and boulders which measure and contain not less than one (1) cubic yard, and no other material, shall be classed as rock excavation. All solid rock and boulders containing one (1) cubic yard or more must be entirely removed from the trench and disposed of before they will be classed and paid for as rock excavation. No materials thus removed and classed as rock excavation and no excavated boulders containing less than one (1) cubic yard will be allowed to be used for backfilling until the same has been broken up into pieces not larger than twelve (12) inches in any dimension and then only as provided for in Section 40.11. No allowance will be made or paid to the Contractor on account of breaking up materials excavated other than the fixed price for rock excavation. The means and methods utilized for the rock removal shall be at the contractor's discretion; however, there will be no increase in the unit price of rock if the contractor elects to change methods of removal, or if the actual quantity removed varies from the bid quantity.

The contractor is responsible for protecting the existing utilities during blasting operations, and a representative from utility will need to be notified in advance of any blasting and may need to be on site whenever blasting is occurring. Blasting will be in accordance with the utilities requirements this may include but not be limited to:

In areas where the blasting will occur within 8 to 10 feet of the utility special measures may need to be taken to protect the utility, such as exposing the utility and placing blast mats between the utility and the blasting, and possibly utilizing a hammer instead of blasting in areas of crossings or in closer proximities.

The contractor will be responsible for any damage to the utilities associated with blasting and should take precautions to prevent damage to the utilities, the means and methods that the contractor elects to utilize to remove the rock will be the contractors responsibility. A preblast

meeting between the selected contractor and all impacted utilities will be required prior to the start of blasting operations.

40.11 BEDDING & COVER

The material below the bottom of the pipe, for the depth shown on the Plans, shall be excavated and the hole backfilled with material conforming to the detail sheet for the type of pipe being installed.

The bedding material shall be placed and thoroughly compacted in lifts not greater than six (6) inches to an elevation eight (8) inches above the top of the pipe. Each six (6) inch lift of bedding material shall be thoroughly hand tamped under and around the sides of the pipe before the succeeding lift is placed. Lifts shall be carried up evenly on both sides of the pipe to prevent unequal pressures on the pipe.

The pipe shall be protected during handling against impact, shocks and free fall. The Contractor shall be required to furnish the necessary slings, straps and other approved devices to permit the satisfactory support of all parts of the pipe when it is lifted.

The limits of the foundation and bedding shall not be less than that shown on the Plans and shall, in all cases, extend to the full width and depth of the excavation.

40.12 BACKFILLING

The trench shall be backfilled with the excavated material, if deemed suitable by the Engineer.

The trench shall be filled and compacted sufficiently to prevent subsequent settlement. The backfill shall be compacted by utilizing a vibratory trench compactor weighing at least 3,000 lbs, and the material shall be evenly spread in layers not exceeding twelve (12) inches in thickness before rolling. Care shall be taken that the material close to the bank or sheeting, as well as in all other portions of the trench, be thoroughly compacted.

No compacting shall be done when the material is too wet to be compacted properly. At such times, the work shall be suspended until the previously placed and new materials have dried out sufficiently to permit proper compacting; or such other precaution shall be taken as may be necessary to obtain proper compaction.

No pieces of rock larger than twelve (12) inches in any dimension shall be considered suitable material for backfilling, and then only in combination with such an amount of fine material as will, in the opinion of the Engineer, form a well compacted mass. The work of backfilling shall not be done with frozen earth, chunks of concrete, chunks of pavement or other debris. No large masses of backfilling material shall be dropped, as from a grab bucket, into the trench in such a manner as to endanger the work.

All voids left by the removal of sheeting shall be completely backfilled with suitable materials and thoroughly compacted. Backfilling around structures shall begin as soon as practicable after the pipes and masonry have been placed and the concrete or brick work has acquired a suitable degree of hardness and shall thereafter be prosecuted expeditiously.

When the sewer, storm sewer or water line is laid cross-country, the backfill shall be brought up and mounded above the existing grade, six (6) inches or as directed. Wherever a loam or gravel surface exists prior to excavation, it shall be removed, conserved and replaced to the full original level and condition.

When the sewer, storm sewer, or water line is laid in a street, backfill shall be brought up to an elevation which is equal the depth of gravel base required, below the bottom of the specified paving thickness for permanent pavement. The Contractor shall then place, in six-(6) inch compacted layers, gravel conforming Section 50.16 C.

40.13 SELECT BACKFILL

If the Engineer determines that excavated material is not suitable for backfill of trenches, or that subgrade material in trenches is not suitable, the Contractor shall install select backfill as directed. The Contractor shall be responsible for disposing of all unsuitable material.

Select backfill shall be installed in twelve-(12) inch compacted layers. Material to be used shall conform to Section 50.16 B.

Crushed rock shall be used as bedding or in place of unsuitable subgrade, as shown of the Plans, or as ordered. Material used shall conform to Section 50.16 A.

Installation of select backfill and crushed rock shall conform to Section 40.11, Bedding and Cover.

40.14 SHEETING AND BRACING

The Contractor shall furnish, put in place, and maintain such sheeting and bracing as may be required to support the sides of the excavation, and prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction or otherwise injure or delay the work or endanger adjacent structures. See Section 30.04. If the Engineer is of the opinion that proper supports have not been provided, he/she may order additional supports be put in at the expense of the Contractor, and compliance with such orders shall not relieve or release the Contractor from his/her responsibility for the sufficiency of such supports. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.

All sheeting and bracing not left in place shall be carefully removed in such manner as not to endanger the construction or other structures, utilities, or property, whether public or private. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools especially adapted to that purpose, by watering or otherwise as may be directed.

40.15 RESTORATION OF TRENCH SURFACE

After the trench has been backfilled in accordance with Section 40.12, the Contractor shall restore the surface of the trench to conform to the existing surface prior to continuing the work.

A. Grass and Lawn Areas. In grassed areas, the Contractor shall restore the surface of the trench and the area adjacent to both sides of the trench that have been damaged by his /her operations, however, payment shall be made for only that area within the pay limits as defined in Section 40.16.

1. Loam. The Contractor shall have the option of removing the existing topsoil, to be reused for restoration, or installing new loam.

   The loam shall be good quality top soil, free of large stones, large clods, roots of trees or shrubs, or other foreign matter. Muck, peat, or other excessively acidic soils shall not be used.

   The loam shall be spread on well prepared areas to a uniform depth as specified. Any remaining clods, roots, stones over two inches in its greatest diameter, or any other foreign matter, shall be removed.

   Restoration of surface in lawn areas shall be the same as for grassed areas except the loam shall be free of stones, clods, roots, shrubs, or any other foreign matter.

   The loam shall be installed at a depth of no less than four (4) inches after rolling, to the grade required. The surface shall be smooth and uniform. Care shall be taken to match the existing grade of the adjacent lawn.

2. Fertilizer and Lime. Fertilizing and liming shall be done when the soil is in a moist condition and at least twenty four (24) hours before sowing the seed. The fertilizer and lime shall be applied to the soil by means of a mechanical spreader or other approved method capable of maintaining a uniform rate of application and shall be thoroughly harrowed, raked or otherwise mixed with the soil to a depth of not less than one (1) inch. The fertilizer and lime shall not be applied together unless applied hydraulically.

   Agricultural limestone shall be applied at the rate of fifty (50) pounds per unit (1,000 square feet).

   Fertilizer shall be applied at the rate of thirty (30) pounds per unit (1,000 square feet).

3. Seeding. Grass seed of the required mixture and quality shall be sown by a mechanical seeder or other method which will sow the seed uniformly at the required rate over the entire area to be seeded. The mechanical seeder shall be capable of being operated to avoid the growth of grass in rows and shall be so operated. After seeding, all areas shall be lightly raked by hand to mix the seed and topsoil. Lawn areas shall be rolled with a light lawn roller. A light application of hay mulch shall be used. If necessary, the hay mulch shall be staked with string to prevent it from being washed or blown away.

   The seed mixture shall be sown at the rate of five (5) pounds per unit (1,000 square feet).

The recommended seeding periods are from April 1 to June 1, and from August 15 to October 1. The Contractor may seed at other times. However, regardless of the time of seeding, he/she shall be responsible for a full growth of grass. When directed he/she shall re-fertilize and re-seed areas on the project which do not develop a satisfactory growth of grass. Re-fertilizing and re-seeding shall be incidental to the original seeding item requirements.

B. Paved Areas. The existing pavement shall be cut back six (6) inches from the sides of the trench and the edges trimmed so that no ragged or irregular joints will exist. Joints with existing pavement shall be clean and cut vertically for the depth of pavement layer being installed.

The Contractor shall be responsible for maintaining temporary pavement or gravel surface until the permanent pavement is installed.

The Contractor shall remove the temporary pavement and/or road gravel necessary to install the required thickness of permanent pavement called for on the Plans and in the Specifications.

Permanent pavement shall be maintained by the Contractor for one (1) year after the Project is completed, in accordance with the City of Lewiston Excavation and Street Opening Manual.

It shall be noted that no matter what the finish thickness of pavement, the depth of gravel base shall be no less than eighteen (18) inches.

40.16 METHOD OF MEASUREMENT (PAY LIMITS)

A. Trench Excavation: Trench width pay limits for earth work items, except road gravel, that are paid for per unit price, shall be the outside diameter of the pipe being installed plus one pipe diameter or a maximum of pipe OD plus 30 (thirty) inchesand a miminum of three feet.

Trench width pay limits for surface restoration items, including road gravel, that are paid for per unit price shall be six (6) feet or as noted on the Plans or Div. 10.

Trench depth pay limits shall be to the actual elevation of the ledge and eight (8) inches below the pipe; for select backfill, and extra structural excavation, it shall be to the depth ordered; for surface restoration, it shall be as specified or as shown on the Plans.

Material installed or removed beyond the pay limits shall not be paid for.

B. Structural Rock Excavation: The quantity of structural rock excavation for which payment shall be made will be the actual number of cubic yards removed, measured in the field, to the limits specified in this section.

C. Select Backfill and Extra Structural Excavation, or Crushed Rock: The quantity of select backfill and/or extra structural excavation, or crushed rock for which payment

shall be made will be the actual number of cubic yards installed and/or removed, measured in the field in place, to the limits specified in this section.

D. Road Gravel: The quantity of road gravel for which payment shall be made will be the number of cubic yards installed to the depth called for and the width installed, as measured in the field in place, not to exceed the limits specified in this section.

E. Loam for Grassed and Lawn Areas: The quantity of loam for grassed and lawn areas for which payment shall be made will be the number of square yards installed to the depth called for and the width installed, as measured in the field, not to exceed the limits specified in this section, or specified in the Supplemental Specifications.

F. Seed: The quantity of seed for which payment shall be made will be the number of square yards installed, as measured in the field, to the limits specified in this section, or specified in the Supplemental Specifications.

G. Permanent Pavement: The quantity of permanent pavement for which payment shall be made will be the number of tons installed to the depth called for and the width installed, not to exceed the limits specified in this section.

40.17 BASIS OF PAYMENT

A. Structural Rock Excavation: The accepted quantities of structural rock excavation shall be paid for, per cubic yard, at the price established in the Proposal. The price shall be for all materials, equipment and labor necessary to do the work, including excavation and disposal of structural rock, supplying and installing select backfill to replace the volume of rock removed and anything else incidental to the proper completion of the work, as specified. No adjustments to the bid price will be made if the actual quantity of rock encountered varies from the bid quantity or by the method used for removal.

B. Select Backfill: The accepted quantities of select backfill shall be paid for, per cubic yard, at the unit price established in the Proposal. The price shall be for all labor, materials (except as otherwise specified), and equipment necessary to furnish and install select backfill, including installation, compaction, and anything else incidental to the proper completion of the work, as specified.

C. Extra Structural Excavation: The accepted quantities of extra structural excavation shall be paid for, per cubic yard, at the unit price established in the Proposal. The price shall be for all labor, equipment and materials necessary for extra structural excavation, including removal and disposal of surplus material, and anything else incidental to the proper completion of the work, as specified.

D. Crushed Rock: The accepted quantities of crushed rock shall be paid for, per cubic yard, at the unit price established in the Proposal. The price shall be for all labor, equipment, and material necessary to furnish and install crushed rock, including preparation of subgrade, compaction and anything else incidental to the proper completion of the work, as specified.

E. Road Gravel: The accepted quantities of road gravel shall be paid for, per cubic yard, at the unit price established in the Proposal. The price shall be for all labor, materials and equipment necessary to furnish and install road gravel, including compaction and anything else incidental to the proper completion of the work, as specified.

F. Loam for Grassed Areas: The accepted quantities of loam for grassed areas shall be paid for, per square yard for the depth specified, at the unit price established in the Proposal. The price shall be for all labor, materials, and equipment necessary to furnish and install loam in grassed areas, including removal and reuse of existing top soil, and/or furnishing loam, preparation of base, fertilizer and lime, installing loam, preparation of loam for seed, and anything else incidental to the proper completion of the work, as specified.

G. Loam for Lawn Areas: The accepted quantities of loam in lawn areas shall be paid for, per square yard for the depth specified, at the unit price established in the proposal. The price shall be for all labor, materials and equipment necessary to furnish and install loam in lawn areas, including furnishing loam, preparation of base, fertilizer and lime, installing loam, preparation of loam for seed, rolling, and anything else incidental to the proper completion of the work, as specified.

H. Seeding: The accepted quantities of seeding shall be paid for, per square yard, at the unit price established in the Proposal. The price shall be for all labor, materials and equipment necessary to furnish and install seed, raking, rolling, mulching, if called for, and anything else incidental to the proper completion of the work, as specified.

I. Permanent Pavement: The accepted quantities of permanent pavement shall be paid for, per ton, at the unit price established in the Proposal for the mix used. The price shall be for all labor, materials and equipment necessary to furnish and install permanent pavement and anything else incidental to the proper completion of the work, as specified.

End of Section

DIVISION 50

MATERIAL SPECIFICATIONS

STANDARD SPECIFICATIONS

Contents

DIVISION 50

MATERIAL SPECIFICATIONS

STANDARD SPECIFICATIONS

50.01 SCOPE

The material specifications included in this division shall be for sanitary sewers, storm sewers, underdrains, and road construction.

50.02 PIPE MATERIALS

Acceptable pipe materials shall be as follows:

Category	Chapter
Sanitary Sewer	50.03, 50.04
Storm Sewer	50.03, 50.04, 50.07, 50.08, 50.09
Sanitary Sewer Force Main	50.05, 50.06
Underdrain	50.03, 50.08

Pipes, manholes, catch basins and any other materials necessary shall be the size and type as shown on the Plans.

50.03 SDR 35 PVC SANITARY AND STORM PIPE AND FITTINGS

Sizes from four (4) inches to fifteen (15) inches shall meet the requirements of ASTM D3034, Standard Specifications for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings, latest revision.

Sizes from eighteen (18) inches to twenty seven (27) inches shall meet the requirements of ASTM F679, Standard Specifications for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings, latest revision.

The joints shall meet the requirements of ASTM D3212, Standard Specifications for Joints for Drain and Sewer Plastic Pipes Using Elastomeric Seals, latest revision.

Gaskets shall meet the requirements of ASTM F477, Standard Specifications for Elastomeric Seals (Gaskets) for Joining Plastic Pipe, latest revision.

The pipe shall be joined with an integral bell, bell-and-spigot type rubber gasketed joint. Each integral bell joint shall consist of a formed bell complete with a single rubber gasket.

All fittings shall utilize rubber gasketed joints.

The pipe shall be made of PVC plastic having a cell classification of 12454-B or 12454-C or 12364-C (with a minimum tensile modulus of five hundred thousand (500,000) PSI) as defined in ASTM D1784, Standard Specifications for Rigid Poly (Vinyl Choride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds, latest revision.

The fittings shall be made of PVC plastic having a cell classification of 12454-B or 12454-C or 13343-C as defined in ASTM D1784, Standard Specifications for Rigid Poly (Vinyl Choride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds, latest revision.

Minimum "pipe stiffness" (F/y) at five (5 %) percent deflection shall be forty-six (46) Lb/in/in for all sizes when tested in accordance with ASTM D2412, Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading, latest revision.

These specifications shall apply to all PVC pipe and fittings to be installed under this Contract.

Notarized affidavits, indicating certification, from the manufacturer that all specifications are met may be required.

50.04 REINFORCED CONCRETE PIPE

The pipe interior shall be smooth and even, free from roughness, projections, indentations, offsets, or irregularities of any kind. The concrete mass shall be dense and uniform. Pipe shall conform to the ASTM C76, Standard Specifications for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe, latest revision, Class III and IV, Wall B, with exceptions and additions as follows: Non-air entraining Portland Cement conforming to ASTM C150, Standard Specifications for Portland Cement, latest revision, Type II, shall be used except as otherwise approved, in writing, by the Engineer. The use of non-bleeding water-reducing, dispersing agent may be permitted, subject to the specific approval of the Engineer. The use of any other admixture will not be permitted. The twenty eight (28)-day compressive strength of the concrete, as indicated by cores cut from the pipe, shall be not less than shown on the Design Requirements tables as shown in ASTM C76, Standard Specifications for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe, latest revision. The average absorption shall not exceed six (6%) percent, with no test exceeding the maximum of six (6%) percent for sanitary sewers, and the concrete core absorption test results for storm sewers shall not exceed nine (9%) percent of the dry mass for Method A or eight and one half (8 1/2%) percent for Method B as per ASTM C76, Standard Specifications For Reinforced Concrete Culvert, Storm Drain, And Sewer Pipe, latest revision. Reinforcement shall be circular for all concrete pipe. Reinforcement in the bell and spigot shall be adequate to prevent damage to the concrete during shipping, handling and installation. Cores indicating reinforcing steel having less than eighty five (85%) percent bond shall be cause for rejection of the lot of pipes. The class pipe to be used shall be as indicated in the Proposal and as shown on the Contract Drawings.

Fine aggregate shall consist of washed inert natural sand conforming to the requirements of ASTM C33, Standard Specification for Concrete Aggregates, latest revision, with a maximum loss of eight (8) percent when subjected to five (5) cycles of the soundness test using magnesium sulfate.

Coarse aggregate shall consist of well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33, Standard Specification for Concrete Aggregates, latest revision, with a maximum loss of eight (8) percent when subjected to five (5) cycles of the soundness test using magnesium sulfate.

The pipe shall be clearly marked as required by ASTM C76, Standard Specifications For Reinforced Concrete Culvert, Storm Drain, And Sewer Pipe, latest revision, by indentation on the pipe barrel in a manner acceptable to the Engineer. The markings may be at either end of the pipe for the convenience of the manufacturer but for any one size shall always be at the same end of each pipe length. Pipe shall not be shipped until the concrete compressive strength has attained four thousand (4,000) psi and not before five (5) days after manufacture, and/or repair, whichever is the longer.

Pipes shall have a minimum laying length of approximately eight (8) feet except as otherwise approved by the Engineer for closure, or other similar special pieces.

The quality of all materials and the finished pipe shall be subject to inspection and approval by the Engineer. Such inspection may be made at the place of manufacture, or on the work site after delivery, or at both places, and the pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though sample pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery to the job shall be marked for identification and shall be removed from the job at once.

The manufacturer shall inspect all pipe joints for out-of-roundness and pipe ends for squareness. The manufacturer shall furnish to the Engineer a notarized affidavit stating all pipe meets the requirements of ASTM C76, Standard Specifications For Reinforced Concrete Culvert, Storm Drain, And Sewer Pipe, latest revision, these Specifications and the joint design with respect to square ends and out-of-round joint surfaces.

Unsatisfactory or damaged pipe will be either permanently rejected or returned for minor repairs. Only those pipes actually conforming to the Specifications and accepted will be listed for approval, shipment and payment. Approved pipe will be so stamped or stenciled on the inside before they are shipped. All pipe which has been damaged after delivery will be rejected, and if such pipe already has been laid in the trench, it shall be acceptably repaired, if permitted, or removed and replaced, entirely at the Contractor's expense.

Pits, blisters, rough spots, breakage, and any other imperfections may be repaired subject to the approval of the Engineer, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final approval. Cement mortar used for repairs shall have a minimum compressive strength of six thousand (6,000)

psi at the end of seven (7) days and seven thousand (7,000) psi at the end of twenty-eight (28) days, when tested in three (3) inch by six (6) inch cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs subject to the approval of the Engineer.

The class of reinforced concrete sewer pipe shall be the tongue and groove or bell and spigot type and shall be provided with a recess on the tongue or spigot end for a round rubber "O-ring" type gasket or a Tylox SupersealTM pre-lubricated gasket system. The rubber gasket shall conform to ASTM C443, Standard Specifications for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets, latest revision.

RCP Class III, IV, and V shall conform to AASHTO M170 and ASTM C76, Standard Specifications For Reinforced Concrete Culvert, Storm Drain, And Sewer Pipe, latest revision.

RCP shall be manufactured using Type II Cement and conform to ASTM C150, Standard Specifications for Portland Cement, latest revision.

Minimum concrete strength for Class III and IV shall be four thousand (4,000) psi at twenty eight (28) days, and six thousand (6,000) psi for Class V.

Reinforcing Steel shall conform to ASTM A185, Standard Specifications for Steel Welded Wire Reinforcement, Plain, for Concrete, latest revision.

Aggregates shall conform to ASTM C33, Standard Specifications for Concrete Aggregate, latest revision, except for gradation.

Joints for Reinforced Concrete Pipe shall conform to ASTM C443, Standard Specifications for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets, latest revision.

All sections shall be steam cured in accordance with ASTM C76, Standard Specifications For Reinforced Concrete Culvert, Storm Drain, And Sewer Pipe, latest revision.

Wall thickness shall be per ASTM C76, Standard Specifications For Reinforced Concrete Culvert, Storm Drain, And Sewer Pipe, latest revision.

50.05 PRESSURE PIPE

Pipe shall conform to AWWA C900, Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4-Inch through 12-Inch, for Water Distribution, and shall have cast iron O.D.'s. Joints shall be in compliance with ASTM D3139 and gaskets meeting ASTM F477. Pipe shall be DR-18 and shall be U.L. approved for four (4) to twelve (12) inch sizes.

Pipe and fittings shall meet the ASTM materials specification for PVC as outlined in this Division of the specifications.

50.06 POLYETHYLENE PRESSURE PIPE

Polyethylene pipe shall be made from high density, extra high molecular weight compound equaling a PE 3408 designation and shall conform to ASTM D1248, Standard Specifications for Polyethylene Plastics Extrusion Materials for Wire and Cable, latest revision, and ASTM D3350, Standard Specifications for Polyethylene Plastics Pipe and Fittings Material, latest revisions; with a cell classification of 345434C.

50.07 SMOOTH INTERIOR CORRUGATED POLYPROPYLENE PIPE

Sizes from twelve (12) inches to thirty (30) inches shall meet the requirements of ASTM F2736 and AASHTO M 330-13. Joints shall meet the requirements of ASTM D3212 and spigots shall have two gaskets.

Sizes from thirty (30) inches to sixty (60) inches shall meet the requirements of ASTM F2764 and AASHTO M 330-13. Joints shall meet the requirements of ASTM D3212 and spigots shall have two gaskets.

50.08 SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE

This specification applies to high density polyethylene corrugated pipe with an integrally formed smooth interior. Acceptable pipes shall be ADS N-12 IB ST as manufactured by Advanced Drainage Systems, Sure-Lok ST as manufactured by Hancor, or approved equal. Pipe shall be joined using a bell and spigot joint.

This specification is applicable to nominal sizes four (4) to sixty (60) inch diameter. Requirements for test methods, dimensions, and markings are those found in AASHTO M294, Standard Specification for Corrugated Polyethelene Drainage Pipe (12"-24"), latest revision, for 12” to 60” pipe. 4” to 10” pipe shall meet AASHTO M252, Standard Specification for Corrugated Polyethelene Drainage Pipe (3"-10"), latest revision, Type S.

Polyethylene pipe and fittings shall be manufactured from virgin PE compounds which comply with the applicable current edition of the AASHTO material specifications for cell classification as defined and described in ASTM D3350, Standard Specifications for Polyethylene Plastics Pipe and Fittings Material, latest revision.

The pipe and fittings shall be free of foreign inclusions and visible defects. The ends of the pipe shall be cut squarely and cleanly so as not to adversely affect joining. Installation shall be in accordance with ASTM D2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications, latest revision.

Fittings produced by manufacturers other than the supplier of the pipe lengths shall not be permitted without the approval of the Project Engineer.

A manufacturer's certification that the product was manufactured, tested, and supplied in accordance with this specification shall be furnished upon request to the Project Engineer.

50.09 POLYETHYLENE CULVERT AND UNDERDRAIN

Corrugated polyethylene culvert and underdrain shall meet the following specifications for solid and perforated pipe:

ASTM F405, Standard Specification for Corrugated Polyethylene (PE) Pipe and Fittings, latest revision.

ASTM F667, Standard Specification for Large Diameter Corrugated Polyethylene Pipe and Fittings, latest revision.

AASHTO M252 and M294 Standard Specification for Corrugated Polyethylene Drainage Pipe.

When underdrain is specified, the perforations shall be cleanly cut and uniformly spaced along the length and circumference of the pipe in a size, shape, and pattern suited to the needs of the user. The pipe may be specified to be covered with a "Filter Sock", in areas where silt is a problem, as determined by the Engineer.

Fittings for polyethylene pipe and underdrain shall not reduce or impair the overall integrity or function of the culvert or pipe line. Only fittings supplied or recommended by the manufacturer shall be used.

50.10 CORRUGATED METAL CULVERT

Galvanized corrugated metal culvert shall conform to AASHTO M218, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) for Corrugated Steel Pipe, latest revision, AASHTO T249, Standard Method of Test for Helical Lock Seam Corrugated Pipe, latest revision, and ASTM A444, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process for Storm Sewer and Drainage Pipe, latest revision. Asphalt coated corrugated metal culvert shall conform to AASHTO M190, Standard Specification for Bituminous-Coated Corrugated Metal Culvert Pipe and Pipe-Arches, latest revision. Aluminum corrugated culvert nuts and bolts shall conform to AASHTO M232, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware, latest revision.

50.11 WATER MATERIALS

For City funded projects, the City of Lewiston shall provide all water line and service materials needed including pipe, fittings, hydrants, valves, valve boxes, curb boxes, corporations, copper pipe, curb stops, tapping sleeves and gates, couplings, and other water line and service materials. See Div. 70.03.

For private developments:
The Developer shall purchase from the City of Lewiston all water line and service materials needed to install the water supply, including pipe, fittings, hydrants, valves, valve boxes, curb boxes, corporations, copper pipe, curb stops, tapping sleeves and gates, couplings, and

other water line and service materials. The Developer shall provide to the City a list of the required materials for the project, for which the City shall provide an estimate of cost. When funds are received from the Developer, the materials included in the materials estimate shall be ordered and delivered to the job site by the supplier. The material will become the Developer's responsibility when he/she receives it from the Water Division, or when work begins for the material already on the job site. The Developer shall inspect it for defects prior to accepting it. Additional materials needed for the project shall be picked up by the contractor at City storage facilities, and surplus materials shall be returned to appropriate storage facilities.

50.12 MANHOLES

Precast Sections - Precast sections and precast bases with bottoms shall conform to ASTM C478, Standard Specifications for Precast Reinforced Concrete Manhole Sections, latest revision, and meet the following additional requirements:

A. The barrel shall be forty eight (48), sixty (60), or seventy two (72)-inch, inside diameter with a wall thickness not less than five (5) inches for forty eight (48)-inch, six (6) inches for sixty (60) inch, and seven (7) inches for seventy two (72) inch.

B. Barrel sections shall have tongue and groove joints with an approved round or fin-type rubber gasket, Ram-neck, “Kent Seal" or approved equal.

C. Type II Cement shall be used except as otherwise approved.

D. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of each precast section.

E. The minimum compressive strength of the concrete in the manhole base, riser, and top sections shall be four thousand (4,000) psi.

F. Sections shall be cured by an approved method and shall not be shipped until at least five (5) days after having been fabricated.

G. Four (4) foot diameter manholes shall have concentric top sections. If there is not sufficient cover to use cones, a flat cover shall be used conforming to specifications given below.

H. Five (5) foot and six (6) foot diameter manholes shall have a precast flat cover. The cover shall be designed for an H-20 loading, and shall meet in all respects, the MaineDOT Specifications. An affidavit shall be submitted.

The manhole sections shall be substantially free of fractures and surface roughness. The planes of the ends of the manhole sections shall be perpendicular to their longitudinal axis, within the limits of the variations given in ASTM C478, Standard Specifications for Precast Reinforced Concrete Manhole Sections, latest revision, sections 12.3, and 12.4.

Manhole sections may be repaired, if necessary, because of imperfections in manufacture or damage during handling and will be acceptable if, in the opinion of the Engineer, the repairs are sound and properly finished and cured and the repaired manhole sections conform to the requirements of this specification.

The quality of materials, the process of manufacture, and the finished manhole sections shall be subject to inspection and approval by the Engineer.

Manhole sections shall be subject to rejection on account of failure to conform to any of the specification requirements. In addition, individual sections of manhole sections may be rejected because of any of the following:

A. Fractures or cracks passing through the wall, except for a single crack that does not exceed the depth of the joint.

B. Defects that indicate mixing and molding not in compliance with ASTM C478, Standard Specifications for Precast Reinforced Concrete Manhole Sections, latest revision, section 11.1.

C. Surface defects indicating honeycombing or open texture.

D. Damaged or cracked ends, where such damage would prevent making a satisfactory joint.

E. Any continuous crack having a surface width of one hundredth (0.01) inch or more and extending for a length of twelve (12) inches or more, regardless of position in section wall.

Manholes shall have cast-in-place flexible manhole sleeves (rubber boots) or approved equal, for connection to all pipe types. The sanitary manhole sections shall be coated with a bitumastic on all outside surfaces. Testing and inspection may be undertaken as required in Div. 60. This work may occur at the place of manufacture, or on the work site after delivery, or at both places. Testing shall conform to the requirements of ASTM designation C478, Standard Specifications for Precast Reinforced Concrete Manhole Sections, latest revision.

New manholes shall be installed with an invert channel as shown on the Plans for the type of manhole installed.

50.13 CATCH BASINS

Catch basins shall be precast and conform to the same specifications as manholes. Acceptable material for catch basin leads shall be as outlined in 50.12.

50.14 FRAMES, COVERS, AND GRATES

Manhole frames shall be ductile iron or cast iron and covers shall be ductile iron. Manufacturer shall certify that the gray iron conforms to ASTM A48/AASHTO M105 Class 35B and ductile iron conforms to ASTM A536. The frame and cover shall meet the AASHTO-H20 loading requirement. The cover shall be hinged and the frame shall have a clear opening of twenty four (24) inches plus or minus and be at least (6) inches in height. The cover shall be removable. The frame and cover for manholes shall be the ERGO Model as manufactured by EJ or approved equal. Catch basin shall be the Cascade type as shown on the detail sheet

50.15 MASONRY

A. Cement shall be domestic Portland Cement conforming to ASTM C150, Standard Specifications for Portland Cement, latest revision, Type II.

B. Lime for mortar shall be hydrated, conforming to ASTM C207, Standard Specifications for Hydrated Lime for Masonry Purposes, latest revision, Type S.

C. Water shall be free from injurious amounts of oils, acids, alkalis or organic matter, and shall be clean and fresh.

D. Brick shall be sound, hard and uniformly burned, regular, and uniform in shape and size, of compact texture and satisfactory to the Engineer. Bricks shall comply with ASTM C32, Standard Specifications for Sewer and Manhole Brick (Made from Clay or Shale), latest revision, Grade SA except that the mean of five tests for absorption shall not exceed eight (8) percent and no individual brick exceed eleven (11) percent. Under-burned or salmon brick will not be acceptable and only whole brick shall be used unless otherwise permitted.

E. Pavers shall be Interlocking Concrete Pavement Institute (ICPI) certified to meet the following requirements set forth in ASTM C936, Standard Specification for Interlocking Concrete Paving Units, latest revision.

1. Minimum compressive strength of eight thousand five hundred (8,500) pounds per square inch (psi) with no individual unit under seven thousand two hundred (7,200) psi.

2. Maximum water absorption of 5% with no unit greater than 7% when tested in accordance with ASTM C140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units, latest revision.

3. Freeze-thaw resistance according to CSA A231.2-95.

Concrete pavers shall be supplied by a Certified Producer and member of ICPI. The ICPI supplier shall be Genest Concrete or equivalent, as approved by the Engineer.

Product name/shape, color, overall dimensions and thickness shall be as shown on the Plans or otherwise specified.

Bedding and joint sand shall be free of deleterious or foreign matter. The sand shall be natural or manufactured from crushed rock. Limestone screenings or stone dust shall not be used. Sand for bedding material shall conform to ASTM C33, Standard Specification for Concrete Aggregate, latest revision. Sand that is to be placed between joints shall conform to ASTM C144, Standard Specifications for Aggregate for Masonry Mortar, latest revision.

F. Detectable warnings on curb ramps shall be cast iron truncated domes of the dimensions shown on the plans. Domes shall be prefabricated by the manufacturer as a pattern on cast iron plates. The manufacturer shall be listed on Maine DOT's Qualified Products list of cast iron detectable warning plates.

The cast iron plates shall be set in MDOT Class A concrete, (4) inches thick and (4) inches wider than the cast iron plates. The set of plates may be precast in the concrete as one unit off-site or placed in concrete on-site.

G. Joint Mortar shall consist of one (1) part Portland Cement, two (2) parts sand and sufficient water to obtain the required consistency. Mortar shall be used within thirty (30) minutes after its preparation.

The cement shall conform to the requirements of Portland Cement AASHTO M85, Specification for Portland Cements Type II or IIA, latest revision.

The sand shall meet the requirements of the following table:

	Percentage by Weight Passing Square Mesh Sieves	
Sieve Designation	Joints Thicker Than 1/2"	Joints 1/2" or Thinner
3/8”	100	-
¼”	100	-
No. 4	95-100	-
No. 8	70-95	85-100
No. 16	45-80	60-90
No. 30	25-55	35-70
No. 50	10-30	15-45
No. 100	2-10	0-15
No. 200	5 Max.	0-5

When necessary, material retained on the number four (4) sieve may be removed.

The sand shall be clean, hard, sharp, durable particles, preferably siliceous, and with not more than five (5) percent in volume of loam, mica, clay, or other deleterious substances, and free from injurious amounts of organic matter. The sand shall be subjected to the colorimetric test for organic impurities, AASHTO T21 (ASTM C40) Organic Impurities in Sands, latest revision, and when a color darker than the reference standard color solution (laboratory designation Plate III) is produced, the material shall be rejected.

50.16 GRANITE CURB

Curbstone shall be of hard and durable granite, light gray in color, free from seams which impair its structural integrity, and of a smooth splitting character. Granite shall come from approved quarries and, when tested, shall have a French coefficient of wear of not less than sixteen (16) or a Los Angeles percentage of wear of not more than thirty two (32). Test sample shall conform to the requirements of ASTM C422, latest revision. Canadian "Caledonia" granite shall not be an acceptable material.

The straight curbstone shall have a minimum length of six (6) feet unless specified otherwise, shall be either five (5) or six (6) inches wide at the top, as specified on the plans, shall be eighteen (18) inches +/- one (1) inch in depth, and shall have a minimum width at the bottom of four (4) inches for two-thirds (2/3) its length. Circular curbstone shall be cut to the curve required with the ends cut on radial lines.

The curbstone shall have top surfaces sawn to approximately true planes and shall have no projection or depression greater than one-eighth (1/8) inch. The front and back arris lines shall be straight and true with no variation from a straight line greater than one-eighth (1/8) inch. Back surfaces of curbstones shall have no projection for a distance of three (3) inches down from the top which would exceed a batter of four (4) inches in twelve (12) inches.

The front face shall be at right angles to the plane of the top and shall be smooth quarry-split, free from drill holes, and with no projection of more than one-half (1/2) inch measured from the vertical plane of the face through the top arris line for a distance down from the top of eight (8) inches. The remaining distance shall have no projections or depressions greater than one (1) inch measured in the same manner.

The ends of all stones shall be square with the planes of the top and face and so finished that when stones are not set, no space more than three-quarters (3/4) inch shall show in the joint for the full width of the top or down on the face for eight (8) inches. The remainder of the end may break back not over eight (8) inches from the plane of the joint.

Sawed curbing shall be thoroughly cleaned of any iron rust or iron particles by sand blasting or other approved methods satisfactory to the Engineer. Any conspicuous saw marks shall be removed with a peen hammer.

Slope curb or edging shall conform to curbstone as to the quality and color of the stone. Slope curb shall be twelve (12) inches +/- one (1) inch in depth, five (5) inches to eight (8) inches thick, and furnished in lengths not less than four (4) feet long.

The front or exposed face shall be smooth quarry-split to an approximate true plane having no projections or depressions which will cause over one (1) inch to show between a two (2) foot straightedge and the face when the straightedge is placed as closely as possible on any part of the face. The top and bottom surfaces of the curb shall be approximately perpendicular to the face of the curb. No drill holes or half drill holes will be permitted on the top surface and half diameter drill holes no greater than three-quarter (3/4) inch in diameter will be permitted on the bottom surface. The top front arris lines shall be straight and true with no variation from a straight line greater than one-quarter (1/4) inch. The bottom arris lines shall be pitched with no variation from the plane of the face more than one-quarter (1/4) inch.

The ends shall be square to the plane of the face and so finished that, when the stones are set, no space more than one half (½) inch shall show in the joint for the full width of the face.

Slope curb or edging for radius corners shall be measured for length along the bottom arris lines and shall be cut to the radius specified for the bottom arris line. The top and bottom arris lines shall be parallel and the ends of the stone shall be finished on a bend to fit the radius specified so that abutting stones will complete the joint as specified in the preceding paragraph for straight stones. The face of the curb shall be cut on a two to one (2:1) slope from the bottom arris line with twelve (12) inches +/- one half (½) inch between the bottom and top arris lines as measured on the slope face. The top and bottom surfaces shall be approximately perpendicular to the face of the curb.

50.17 EARTHWORK

A. Crushed Rock: Material used for crushed rock bedding shall conform to the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
1 inch	100
3/4 inch	90 - 100
3/8 inch	0 - 75
No. 4	0 - 25
No. 10	0 - 5

B. Aggregate Subbase: Aggregate Subbase shall be gravel consisting of hard, durable particles which are free from vegetable matter, lumps or balls of clay, and other deleterious substances. The gradation of the portion which will pass a three (3) inch sieve shall meet the grading requirements of the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
1/4 inch	25-70
No. 40	5-30
No. 200	0-7

Granular subbase and gravel subbase shall not contain particles of rock which will not pass the six (6) inch square mesh sieve.

Gradation tests shall conform to AASHTO Method T-27 Sieve Analysis of Aggregates, latest revision, except that the material may be separated on the one half (½) inch sieve.

C. Aggregate Base. Aggregate Base shall be screened or crushed gravel consisting of hard durable particles which are free from vegetable matter, lumps or balls of clay, and other deleterious substances. The gradation shall meet the requirements of the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	Screened	Crushed
½ inch	35-75	45-70
¼ inch	25-60	30-55
No. 40	0-25	0-20
No. 200	0-5	0-5

Screened gravel base shall not contain particles of rock which do not pass the three (3) inch square mesh sieve. Crushed gravel base shall not contain particles of rock which will not pass the one and a half (1½) inch square mesh sieve.

D. Underdrain Material. Underdrain backfill or material such as sand and crushed or uncrushed material used as bedding shall meet MDOT Specification 703.22, Underdrain Backfill Material, as defined in the following table. Underdrain sand used in conjunction with a filter sock shall also meet MDOT Specification 703.22, Underdrain Backfill Material, as defined in the following table.

The granular material (sand) for underdrain pipe shall be free from organic matter and shall conform to the following table:

Sand		Crushed Backfill	
Sieve Designation	Percentage by Weigh Passing Square Mesh Sieve	Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
1 inch	95-100	1 inch	100
½ inch	75-100	¾ inch	90-100
No. 4	50-100	$^{3}/_{8}$ inch	0-75
No. 20	15-80	No. 4	0-25
No. 50	0-15	No. 10	0-5
No. 200	0-5		

E. Geotextiles. Geotextiles shall conform to the Maine Department of Transportation Standard Specifications listed below, latest revision.

Stabilization/Reinforcement	Drainage	Erosion Control
722.01	722.02	722.03

F. Common Borrow. Common borrow shall consist of earth, suitable for embankment construction. It shall be free from frozen material, perishable rubbish, peat and other unsuitable material.

The moisture content shall be sufficient to provide the required compaction and stable embankment. In no case shall the moisture exceed four (4) percent above optimum.

The optimum moisture content shall be determined in accordance with AASHTO T180, Moisture-Density Relations of Soils Using a 101 pound (45.4 kg) Rammer and an 18 in. (457 mm) drop, latest revision, Method C or D.

G. Plain and Hand Laid Riprap. Stones shall consist of sound durable rock which will not disintegrate by exposure to water or weather. Either field stone or rough, unhewn quarry stone may be used. Exposed stones shall be angular and as nearly rectangular in cross-section as practicable. Rounded boulders or cobbles will not be permitted. Stones shall weigh from ten (10) pounds to two hundred (200) pounds except that when available suitable stones weighing more than two hundred (200) pounds may be used. Approximately fifty (50) percent of the stones by volume shall exceed a unit weight of fifty (50) pounds.

50.18 LOAM SEED, AND MULCH

A. Loam: All loam shall be good quality, screened topsoil, free of large stones, clods, roots of trees or shrubs, or other foreign matter, meeting the following specifications:

Organic Content	**Percent by Volume**
Humus	10-20% as determined by ignition test
pH	5.5-8.0

Mineral Content		**Percent by Volume**
Sand	.08-.003 in. in diameter	45%-75%
Silt	.002-.00008 in. in diameter	20%-40%
Clay	less than .00008 in. in diameter	5%-15%

B. Lime: Lime shall be ground limestone containing not less than 85% calcium and magnesium carbonate.

C. Fertilizer: Grass seed fertilizer shall be a 21-10-21.

D. Seed: Grass seed shall be certified as to mixture, germination, purity, and live seed, conforming to the following:

1. Percent germination no less than eighty (80) percent
2. Pure live seed no less than eighty five (85) percent
3. Percent purity no less than eighty five (85) percent
4. Weed seed not more than one (1) percent
5. All seed shall be from the current year's crop unless recent tests by an approved testing agency demonstrate that older seed meets the above requirements.

E. Mulch: Mulch shall consist of long fibered hay or straw reasonably free from noxious weeds or other undesirable materials.

50.19 GUARDRAILS

Guardrails shall be Type 3-Galvanized steel "w" beam, wood posts or galvanized steel posts as shown on the Plans.

Materials shall meet the requirements specified in the following Subsections of Division 700 of the Maine Department of Transportation Standard Specifications, of latest revision:

Timber Preservative	708.05
Metal Beam Rail	710.04
Guardrail Posts	710.07
Guardrail Hardware	710.08

Guardrail components shall meet the applicable standards of " A Guide to Standardized Highway Barrier Rail Hardware" prepared and approved by the AASHTO-AGC-ARTRA Joint Cooperative Committee, Technical Bulletin Number 268-B.

Posts for guardrail delineators shall be "U" channel steel, eight (8) feet long, two and one half (2-1/2) pounds per linear foot minimum and have three eighths (3/8) inch round holes, one (1) inch center to center for a minimum distance of (2) feet from the top of the post.

50.20 FLOWABLE FILL

The concrete used shall have an aggregate size of three eighths (3/8) inch, and shall have an ultimate compressive strength between one thousand (1,000) psi and one thousand five hundred (1,500) psi as determined by ASTM D4832, Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders, latest revision. Slump shall be between eight (8) inches and ten (10) inches. The Contractor shall submit the mix design at the pre-construction meeting and receive Engineer approval before work shall commence.

The flowable fill shall be discharged directly from the mixer truck into the space to be filled. No compaction or vibration of the material is required. All necessary means to confine the material within the designated space shall be provided. No flowable fill shall be placed on frozen ground. At the time of placement, the flowable fill shall have a temperature of at least forty (40) degrees F. When flowable fill is placed in freezing temperatures, the material should be covered with blankets overnight. The flowable fill shall be left undisturbed until the material gains sufficient strength.

End of Section

DIVISION 60

SEWERS and DRAINS

STANDARD SPECIFICATIONS

Contents

DIVISION 60

SEWERS and DRAINS

STANDARD SPECIFICATIONS

60.01 SCOPE

This division shall govern the installation of sanitary and storm sewers and underdrain, including installation of pipe, manholes, catch basins and catch basin leads.

60.02 REFERENCES

This division references the following documents. In their latest revision, they form a part of this specification to the extent specified herein. In case of conflict, the requirements of this specification shall prevail.

ASTM A126	Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A240/T304	Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
ASTM A581	Standard Specification for Free-Machining Stainless Steel Wire and Wire Rods
ASTM B124	Standard Specification for Copper and Copper Alloy Forging Rod, Bar and Shapes
ASTM C923	Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals
ASTM D2133	Specifications for Acetal Resin Injection Molding and Extrusion Materials
ASTM D2321	Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

Related Divisions

Division 40	Structural Earthwork
Division 50	Materials

60.03 UTILITY CONFLICTS

Storm drain services, sanitary sewer services, water services, or other utilities which do not directly conflict with the new storm drain system, but which are encountered and broken during the course of the construction, shall be repaired at the expense of the Contractor. All broken storm and sanitary piping shall be repaired using SDR 35 pipe and “Calder” type no hub couplings, or other methods approved by the Engineer. All utilities shall be repaired in accordance with the utilities’ regulations. All storm drain lines which are encountered during the course of construction shall be connected to the new storm drain system.

60.04 SEWER AND STORM DRAIN INSTALLATION

A. SDR 35 PVC, Smooth Interior Corrugated Polyethylene and Polypropylene Pipe - Pipe shall be installed in accordance with the manufacturer's instructions and the following details. The pipe shall be firmly bedded in crushed rock to accurately conform to the line and grade indicated on the Plans. Excavation for bells (bell holes) shall be provided so that the pipe is uniformly supported along its entire length.

The Contractor shall make certain the bell, rubber ring, and spigot are clean and lubricated (lubricant to be in accordance with manufacturer's instructions) prior to assembling. Assemble the pipe by pushing the spigot into the bell until the reference mark on the pipe barrel is flush with the end of the bell. This shall be done by hand or by bar and block. On pipe fifteen (15) inches or larger in diameter, mechanical assistance may be necessary in addition to the bar and block. At no time will purely mechanical means be permitted. Swinging or stabbing of the pipe in order to facilitate pipe sealing will not be permitted.

After the pipe is assembled, the crushed rock haunching shall be installed and compacted to eliminate any voids under the pipe. The Contractor shall exercise care to avoid moving the pipe off line and grade. The cover material shall be in accordance with design drawings, unless specified otherwise by the Engineer, and shall be installed to eight inches above the top of the pipe.

The Contractor shall use care in handling and installing the pipe and fittings. Under no circumstances shall pipe or fittings be dropped, thrown, kicked, etc., during installation or unloading. The interior of the pipe shall be kept clean of oil, dirt, and foreign matter. Catch basin leads shall be installed in the same manner as indicated in the specifications for PVC pipe. The pipe shall be connected to catch basins, existing manholes, reinforced concrete pipe, and vitrified clay pipe by installing a rubber ring water stop of the appropriate size to the lead with a stainless steel strap and then mortaring the lead and bushing into the hole in the pipe, catch basin, or manhole on the outside and inside with a grout that expands on curing, with the "Kor-N-Seal" process, or approved equal. The pipe shall be cut off flush with the inside of the manhole or sewer. Inside a catch basin, the pipe shall be cut off, so that a nipple will extend no more than four (4) inches beyond the inside of the structure.

B. Polyethylene Pressure Pipe - Polyethylene pressure pipe may be directly buried, sliplined in a casing, submerged, laid on the surface, or suspended. Polyethylene pipe shall be encapsulated in a uniform grade of quality, compacted fill material. Pipe bedding and cover shall be the same as for SDR 35 PVC. Compaction of eighty five (85) percent or greater will enable higher surface load and limit deflection.

C. Polyethylene Culvert and Underdrain - Crushed stone, shall be used as bedding and envelope material around the pipe. Aggregate size should not exceed one inch.

Load bearing capability of flexible conduit is dependent upon the type of backfill material used and the degree of compaction achieved. Crushed stone and gravel backfill material typically reach a compaction level of ninety to ninety five (90 to 95) percent AASHTO standard density without compaction. When native soils are used as backfill material, a compaction level of eighty five (85) percent is required. This is the minimum compaction that is recommended by all culvert pipe manufacturers and can be achieved by either hand or mechanical tamping.

D. Corrugated Metal Culvert - The pipe shall be bedded on an adequate, uniform foundation and backfilled with selected granular material placed in six (6) inch layers evenly on both sides of the pipe and tamped thoroughly.

The selected granular material shall be compacted to eighty five (85) percent of standard density based on AASHTO T99, latest revision, assuming a unit weight of soil equaling one hundred twenty (120) lb. per cu. ft.

E. Reinforced Concrete Pipe - As soon as the excavation is completed to the normal grade of the bottom of the trench, the Contractor shall immediately place material in accordance with Design Drawings in the trench and then the pipe shall be firmly bedded in this gravel or crushed rock to conform accurately to the lines and grades indicated on the Design Drawings.

Material in accordance with Design Drawings shall be placed and compacted to give complete vertical and lateral support for the lower section of the pipe as indicated on the Drawings. A depression shall be left in the supporting gravel or crushed rock at the joint to provide a "bell hole" so that the pipe is uniformly supported along its entire length and to prevent contamination of the rubber gasket immediately before being forced home.

Before the pipe is lowered into the trench, the tongue and groove must be cleaned and free from dirt. Gasket and bell shall be lubricated by a vegetable lubricant, which is not soluble in water, furnished by the pipe manufacturer and harmless to the rubber gasket. The pipe shall be properly aligned in the trench to avoid any possibility of contact with the side of the trench and fouling of the gasket. As soon as the spigot is centered in the bell of the previously laid pipe, it shall be forced home with jacks or come-alongs. After the gasket is compressed and before the pipe is brought fully home, each gasket shall be carefully checked for proper position around the full circumference of the joint. Steel inserts shall be used to prevent the pipe from going home until the feeler gauge is used to check the final position of the gasket. The jacks or come-alongs shall be anchored sufficiently back along the pipeline (a minimum of five (5) lengths) so that the pulling force will not dislodge the pieces of pipe already in place. Only a jack or come-along shall be employed to force the pipe home smoothly and evenly, and to hold the pipe while backfilling is in progress. Under no circumstances shall crowbars alone be used.

As soon as the pipe is in place and before the come-along is released, material in accordance with Design Drawings, shall be placed and compacted as indicated on the Drawings for at least one-half the length of pipe. Not until this backfill is placed shall the come-along be released. If any motion at joints can be detected, a greater amount of backfill shall be placed before pressure is released.

60.05 UNDERDRAIN INSTALLATION

This work shall consist of the construction of underdrain using pipe and filter material and pipe outlets, in accordance with these Specifications and the Standard Details and in reasonably close conformity with the lines and grades shown on the Plans or established by the Engineer.

A. Materials shall meet the requirements specified in Division 50 – Materials.

B. Installation:

1. Type "B": The trench shall be excavated to the required width and depth. A bed of the specified granular material, three inches in depth, shall be installed and thoroughly compacted. Six (6) inch perforated pipe shall be laid on this bed with perforations down.

   After the pipe has been firmly bedded and joints securely connected, it will be inspected before any backfill is placed. The remaining backfill shall be granular material meeting the same requirements as that used for bedding the pipe. The material shall be placed in eight (8) inch layers, loose measure, and thoroughly compacted except, that the initial layer of backfill around the pipe may be placed in a layer not exceeding ten (10) inches. The upstream end of all completed underdrain pipe that is to be buried shall be sealed with cement mortar or other material acceptable to the Engineer.

2. Type "C": The trench shall be excavated to the depth and width specified in the Plans. The perforated pipe shall be laid to the line and grade centered on the bottom of the trench with the perforations up. After the pipe has been firmly bedded and all joints securely connected, it will be inspected before any backfill is placed. The backfill shall be placed in accordance with Division 40 - Structural Earthwork and as shown on the Plans using the materials specified.

60.06 RIP RAP INSTALLATION

This work shall consist of any excavation required and installation of protective covering of stone laid on earth.
Stones used shall consist of sound, durable rock which will not become disintegrated by exposure to the action of water or weather. Either field stone or rough, unhewn quarry stone

may be used. The stones shall be angular and as nearly rectangular in cross-section as practicable. Rounded boulders or cobbles will not be permitted.

Stone ditch protection, plunge pools, and inlet erosion control shall be installed by excavating below the flow line to allow placement of the rock material to the specified depth. The stone protection shall be placed, full depth, in one operation without special handwork, shall be approximately true to line and grade and shall be uniform in appearance.

60.07 MANHOLE INSTALLATION

Manholes shall be constructed to the dimensions shown on the Drawings and as specified in these Specifications. Bases for sewer manholes shall be precast with floors and holes for pipe. Precast concrete manhole sections shall be set so as to be vertical and with sections in true alignment with a one quarter (1/4) inch maximum tolerance to be allowed. The Contractor shall install the precast sections in a manner that will result in a water tight joint.

Holes in the concrete pipe sections required for handling or other purposes shall be plugged with a non-shrinking grout or by grout in combination with concrete plugs.

Where holes must be cut in the precast sections to accommodate pipes, cutting shall be done prior to setting them in place to prevent any subsequent jarring which may damage the structure or bring it out of alignment.

After the hole for the manhole is excavated, in accordance with these Specifications, a gravel or crushed rock foundation shall be installed to a depth of one (1) foot below the bottom of the manhole and one (1) foot beyond the outside of the manhole.

Precast sections to be used for storm manholes shall be jointed with a single row of "Ram-Nek", "Kent Seal", or approved equal, and a double row of "Ram-Nek" or "Kent Seal" or approved equal, shall be used on sanitary manholes.

60.08 CATCH BASIN INSTALLATION

All leads connecting new, relocated, and existing catch basins to the new system shall be SDR 35 PVC, ADS-N12, or approved equal. New precast catch basin sections shall be jointed with "Ram-Nek", "Kent Seal", or approved equal. Catch basins shall be connected to other catch basins or storm manholes by installing a rubber ring water stop of the appropriate size to the lead and bushing into the hole in the pipe or basin on the outside and inside with a grout that expands on curing. Catch basin installation shall include the cost of removing and disposing of the existing catch basins, furnishing and installing the new catch basins, the frame and cover, floatables hood on outlet pipes 15 inches or less, other materials and installation costs, and all other incidental work. All existing catch basin frames and covers shall remain the property of the City. All catch basins shall be located in the field by the Contractor at the approximate locations as shown on the Plans, and as approved by the Engineer. It shall be the Contractor's responsibility to set the basins as illustrated on the Detail Sheets to maximize the collection of surface water. Any basins which are not set as

shown, or fail to maximize the collection of surface water shall be reset by the Contractor at his expense, as directed by the Engineer.

60.09 DEWATERING TRENCH

The Contractor shall furnish all labor, materials, equipment and incidentals required and perform the installation of the pipe, manholes, wet wells, etc. The Contractor may choose any satisfactory method he/she wishes for handling groundwater or surface water encountered in the work, provided they are acceptable to the Engineer, and the Contractor shall assume all responsibility for the adequacy of the method, materials and equipment employed. The cost for dewatering will be included in the cost of the pipe installation.

60.10 FORCE MAIN:

The six (6") inch force main pipe shall be SDR 18 PVC, or SDR 15.5 polyethylene. All ductile iron, class 350, bends, fittings and retainer glands will be supplied by the City.

Upon completing installation of the force main, the Contractor shall perform a Hydrostatic Test of the force main. The Contractor shall supply the testing equipment and conduct the test.

The Contractor shall connect the testing equipment to the new main and slowly bring the pressure up to 100 psi and allow the pressure to stabilize for several minutes. The initial elevation of water in the reservoir barrel shall be measured. The duration of the test shall be 30 minutes and a final elevation of water in the reservoir barrel shall be measured. The difference in the two measurements is the actual leakage. Allowable leakage shall be less than 75 gpd/in./dia./mile of pipe.

If the test does not meet the requirements set forth, the Contractor shall find and correct the problem. The new main, or section thereof, shall be re-tested until the allowable leakage is obtained. All this shall be done at the Contractor's expense.

60.11 SEWAGE AIR VALVES:

Sewage air valves shall be two (2") inch APCO Series 440 as manufactured by DeZurik, Sartell, MN, or approved equal.

The float shall be heavily constructed stainless steel, hermetically sealed; and having a concave bottom impact area to provide immediate resistance to flow and instant upwards movement to shut off the large orifice "without spilling".

The Buna-N seat must be fastened to the valve cover, without distortion for drop tight shut-off.

Valve exterior shall be painted Phenolic Primer Red Oxide for high resistance to corrosion.

In addition to the standard valves, the Contractor shall provide inlet and blow off valves, quick disconnect couplings and minimum five (5') foot hose for flushing for each valve.

The Contractor shall install the valve assemblies in a four (4') foot diameter concrete pit and anchor the assembly to the manhole as illustrated in the standard detail sheet.

60.12 MANHOLE INVERTS

Unless specified, all manholes shall have inverts built in them. Inverts may be of brick or concrete construction except that sewer invert channels shall be lined with water struck hard burnt brick set on edge in a full bed of mortar or epoxy coated precast concrete. Plastering, with mortar, of the exposed face of the brick in the channel lining shall not be allowed. All invert channels shall be carried up to the top of the highest pipe and shall be well formed to true radii and smooth. The tops of the invert shelves shall slope upward from the edge of the channel on a slope as shown on the Plans.

60.13 FRAMES & COVERS

Frames and covers shall be installed on all manholes and catch basins as shown on the Plans. Adjustment of covers and frames shall be accomplished by the use of bricks, set in a full bed of mortar, laid radially, from the top of the structure, with a minimum of two courses of bricks and a maximum of six (6) courses of bricks for manholes and catch basins located in streets. The frame shall be set firm and true to grade, matching the shape of the street at that location, and mortar shall be plastered on the outside of the bricks from the top of the structure up over the base flange to the top of the frame, leaving a clean smooth surface, free of projections.

60.14 EXFILTRATION-INFILTRATION TEST

An exfiltration-infiltration test shall not be required for storm sewers.

Sanitary sewers shall be tested for exfiltration-infiltration by the use of the air pressure method.

A. After backfilling pipeline from manhole to manhole, the Contractor, in the presence of the Engineer, shall conduct an air leakage test using low pressure air.

B. Equipment: Cherne Air-Loc equipment as manufactured by Cherne Industrial, Inc. of Hopkins, Minnesota or approved equal. Equipment used shall meet the following minimum requirements:

1. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.

2. Pneumatic plug shall resist internal test pressures without requiring external bracing or blocking.

3. All air used shall pass through a single control panel.

4. Three individual hoses shall be used for the following connections:

a) From control panel to pneumatic plugs for inflation.
b) From control panel to sealed line for introducing the low pressure air.
c) From sealed line to control panel for continually monitoring the air pressure rise in the sealed line.

C. Procedures:

1. All pneumatic plugs shall be seal tested before being used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs to twenty five (25) psig. The sealed pipe shall be pressurized to five (5) psig. The plugs must hold against this pressure without having to be braced.

2. After a manhole to manhole reach of pipe has been backfilled and cleaned, and the pneumatic plugs are checked by the above procedure, the plugs shall be placed in the line at each manhole and inflated to twenty five (25) psig. Low pressure air shall be introduced into this sealed line until the internal air pressure reaches four (4) psig greater than the average back pressure of any ground water that may be over the pipe. At least two (2) minutes shall be allowed for the air pressure to stabilize.

3. After the stabilization period (three and one half (3.5) psig minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of line being tested shall be termed "Acceptable", if the time required, in minutes, for the pressure to decrease from three and one half to two and one half (3.5 to 2.5) psig (greater than the average back pressure of any ground water that may be over the pipe) is not less than the time set forth in the following table:

Pipe Diameter in Inches	Minutes
4	2.0
6	3.0
8	4.0
10	5.0
12	5.5
15	7.5
18	8.5
21	10.0
24	11.5
30	14.5
36	17.0
42	20.0
54	25.5

4. In areas where groundwater is known to exist, the Contractor shall install a one half (1/2) inch diameter capped pipe nipple, approximately ten (10) inches long, through the manhole wall on top of one of the sewer lines entering the manhole. This shall be done at the time the sewer line is installed. Immediately prior to the performance of the leakage test, the ground water shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the nipple. The plastic tube shall be held vertically and a measurement taken after the water has stopped rising in this plastic tube. The height in feet shall be divided by two and three tenths (2.3) to establish the pounds of pressure that will be added to all readings. (For example, if the height of water is eleven and one half (11-1/2) feet, then the added pressure will be five (5) psig. This increases the three and one half to eight and one half (3.5 to 8.5) psig, and the two and one half to seven and one half (2.5 to 7.5) psig. The allowable drop of one (1) pound and the timing remains the same.

5. If the installation fails to meet this requirement, the Contractor shall, at his/her own expense, determine the source of leakage. He/she shall then repair or replace all defective materials and/or workmanship.

60.15 VACUUM TEST FOR MANHOLES

A vacuum test will not be required for storm manholes.

Sanitary sewer manholes shall be tested for exfiltration-infiltration by use of the vacuum test.

A. Vacuum Test shall be as follows:

1. The testing shall be done after assembly of the manhole and prior to backfilling the structure.

2. The manhole to pipe connection shall be a flexible connector.

3. All lift holes shall be plugged with a non-shrinking mortar, such as "Water Plug" or approved equal. The seal between the manhole sections shall be in accordance with ASTM C923.

4. The Contractor shall plug the pipe openings, taking care to securely brace the plugs and the pipe.

5. With the vacuum tester set in place:

a. Inflate the compression band to affect a seal between the vacuum base and the structure.
b. Connect the vacuum pump to the outlet port with the valve open.
c. Draw a vacuum to ten (10) inches of Hg and close the valve.

B. The test shall pass if the vacuum remains at ten (10) inches of Hg or drops to nine (9) inches of Hg in a time greater than one minute. If the manhole fails the initial test, the Contractor shall locate the leak and make proper repairs. Leaks may be filled with a wet slurry of accepted quick setting material.

60.16 SEWER SERVICES

SDR 35 PVC shall be used for the installation of new sewer services and the relocation or repair of existing sewer services. Head-on connections to the existing service pipe shall be made with "Fernco" or "Calder" type couplings. Connections to manholes shall be made as specified in Section 60.04. Tee connections to SDR 35 PVC pipe, RCP or polypropylene pipe shall be made using an appropriately sized Inserta Tee.

60.17 LINE AND GRADE

The Contractor will be supplied with bench marks within the work area, so that he/she may be able to establish grade and set up a pipe laser or rotary slope laser. Replacement of any points established by the Engineer will be done at the expense of the Contractor if such replacement is necessary due to the Contractor's negligence.

60.18 METHOD OF MEASUREMENT

A. Sewer and Drain Pipe: The quantity of pipe for which payment shall be made will be the actual number of linear feet of pipe installed, measured in place, from center to center of manholes, with no deduction made for manholes.

B. Underdrain: The quantity of underdrain to be included for payment will be the length, in linear feet, installed and measured in place.

C. Manholes: The quantity of manholes for which payment shall be made will be the actual number of vertical feet installed, measured in place, from the center of the invert to the top of the rim.

D. Catch Basins: Catch basins shall be paid for on a lump sum basis for each basin.

E. Riprap: Riprap, for which payment shall be made, will be measured by the cubic yard complete and in place.

60.19 BASIS OF PAYMENT

A. Sewer and Drain Pipe: The accepted quantities of pipe for main, services, and catch basin leads shall be paid for, per linear foot, at the Contract unit prices, for the various sizes of pipe. The price shall include all materials, equipment, and labor necessary for excavation (except structural rock excavation), installation of pipe, bedding and cover backfill and anything else incidental to the proper completion of the work, as specified herein.

B. Underdrain: The accepted quantities of underdrain will be paid for at the Contract unit price per linear foot of each type and size specified, complete in place The price will be for all equipment, labor, and materials necessary to satisfactorily install underdrain, including excavation, bedding, pipe cover, and backfill.

C. Manholes: The accepted quantities of manholes shall be paid for, per vertical foot, at the Contract unit prices, for the specified type of manhole. The price shall be for all material, equipment, and labor necessary to furnish and install the manhole, including excavation (except structural rock excavation), bedding, connecting sewer/drain pipes to manhole, all concrete work, backfill, all masonry work for inverts and frames, installation of frames and covers, adjusting frames to grade, testing, and anything else incidental to the proper completion of the work, as specified herein.

D. Catch Basins: The accepted quantities of catch basins shall be paid for at the lump sum Contract unit price. The price shall be for all material, equipment, and labor necessary to furnish and install the catch basin, including excavation, crushed rock bedding and gravel or crushed rock backfill, furnishing and installing frames and grates and anything else incidental to the proper completion of the work, as specified herein.

E. Riprap: The accepted quantities of riprap, for which payment shall be made, will be at the Contract unit price per cubic yard, in place. Payment shall include installation of fabric under the riprap.

End of Section

DIVISION 80

PAVING

STANDARD SPECIFICATIONS

Content

DIVISION 80

PAVING

STANDARD SPECIFICATIONS

80.01 SCOPE

This division shall govern the paving of existing City streets, proposed City streets, sidewalks or parking lots, fine grading on gravel or reclaimed streets, and paving of properly prepared utility trenches as designated. The work shall consist of furnishing and placing one or more courses of Maine Department of Transportation (MaineDOT) approved Hot Mix Asphalt (HMA) pavement on paved or gravel streets, properly prepared for paving. Paving shall be designated Class I, where the Contractor shall prepare the street for paving, or Class II, where the City crews will prepare the street for paving as specified herein. The paving Contractor shall perform the paving for both Class 1 and Class II paving projects.

The finished product shall conform to all required grades, thickness and slopes as required to maintain proper drainage and safe passage of motor vehicles.

All work shall comply with the Contract Documents, project plans and the latest City and MaineDOT Standard Specifications. All HMA provided by the Contractor shall be designed, tested and placed in accordance with AASHTO R35 procedures, MaineDOT Specifications and Current Special Provisions, Section, 106, 108, 401, and 403, 409 except as specified, modified or excluded by these Contract Documents. The provisions of the most current MaineDOT Standard Specifications for Quality Control and Acceptance shall not specifically apply to this work, however, the City reserves the right to test any hot mix asphalt placed for conformance to the specifications.

80.02 PAVEMENTS

The types of paving shall consist of:

A. Re-surfacing: Re-surfacing shall consist of placing a new wearing surface over a prepared bituminous surface. The Engineer or Paving Manager will specify the use of a MaineDOT approved HMA Pavement, 12.5mm, 9.5mm fine, and 9.5mm coarse. Where existing pavement is removed, section 80.02C shall apply.

B. Maintenance Paving: Maintenance paving shall consist of the correction of surface defects in the travel way by placing a leveling course and new wearing surface using HMA Pavement. This will normally be 9.5mm, either fine or coarse grade. The Engineer or Paving Manager may specify a 50 or 75 gyration mix design for maintenance paving.

C. Paving of Gravel or Reclaimed Streets: Paving of gravel or reclaimed streets shall consist of placing base and surface courses using HMA Pavement, 19mm, 12.5mm, 9.5mm coarse, or 9.5mm fine as directed by the Engineer or Paving Manager. The Engineer or

Paving Manager shall approve any revisions to the compacted thickness, number of courses or type of mix noted in the paving schedule.

D. Bituminous Curbing: The installation and materials provided shall be in accordance with the most current MaineDOT Standard Specifications. Polyester fibers shall be uniformly incorporated into the dry mix. The Engineer or the Paving Manager will specify the type of mold and the location where the curbing shall be placed. The curb may be accepted or rejected based on appearance, texture or alignment. It shall be the Contractor's responsibility to protect and maintain the curb until the project is completed and accepted. All curb determined by the Engineer or Paving Manager to be unacceptable shall be removed and replaced at the Contractor's expense.

80.03 PAVING REQUIREMENTS

Class "I" paving shall mean that the Contractor will provide all labor, equipment and materials, required for paving preparation and paving. When Class I paving is specified, the City Specifications shall be modified as follows:

A. Paved Streets: The Contractor shall be responsible for thoroughly cleaning of all holes, cracks, or loose unstable material from the existing surface to be worked. Any area to be patched or to receive a leveling course shall have an approved bituminous tack material applied to the entire paved surface to be covered and all edges prior to patching or paving. Paving preparation shall be by hand for small areas with minor pavement defects. Larger areas with more severe deterioration may be prepared by a leveling course placed mechanically using paving equipment. All patching material or leveling courses shall be thoroughly compacted using hand tampers or rollers as specified by the City Engineer or Paving Manager. The Contractor shall be responsible for providing any hand or mechanical sweeping prior to patching, placing a leveling course or resurfacing of the work area. The Contractor shall also be responsible for the removal of any material not removed by the sweeping equipment. No direct payment for surface preparation will be made. The cost of all such work shall be included in the unit price for leveling course. In all cases, the preparation of existing surfaces shall comply with the most current MaineDOT Special Provision section 401.11.

B. Gravel Streets: The Contractor shall grade and compact gravel streets to their proper finished grade and cross-section. The Contractor shall rework any streets made necessary by bad weather or any other conditions prior to paving, at no extra cost to the City. For streets with utilities not yet accepted by the City, the Contractor shall be responsible for raising utility structures and utility control devices such as gate valves to proper grade prior to, or during the placement of each course of pavement. The Paving Manager and the responsible Highway District Manager will inspect the project prior to paving to ensure it is properly prepared prior to the Contractor starting work. The City reserves the right to test the compaction or check the grade or cross slope of the gravel base at any location or time prior to paving operations. The Contractor shall comply with the most current MaineDOT Standard Specification sections 304.01 to 304.05 where applicable.

C. Driveways or Side Streets: If the existing pavement on the driveway or side street is in good condition the Contractor may be allowed to grind a transverse butt joint a specified distance into the Side Street or driveway. The existing pavement shall then be overlaid to match the new street pavement. The City Engineer or Paving Manager shall specify the method of construction.

If the driveway or side street is in poor condition, the Contractor shall cut and remove the deteriorated asphalt pavement from any intersecting street, driveway or parking lot etc. a distance to be specified by the Engineer or the Paving Manager. The Contractor shall then repave the intersecting areas to match the newly paved City Street maintaining proper drainage. The contractor shall place the number of courses and type of HMA pavement specified by the Engineer or Paving Manager.

Class II Paving shall mean that the City shall prepare the gravel base or existing paved surface for the Contractor to apply the specified pavement. The City will notify the Contractor two weeks before the street is ready for paving. The Contractor shall complete the work within 15 days of said notification. When Class II paving is called for, the Standard Specifications shall be modified as follows:

A. Paved Streets: Surface preparation on paved streets shall require the Contractor to be responsible for placing a leveling course, as needed, utilizing mechanical paving equipment paid for at the Contract Unit Price. All of the surface to be leveled shall have an approved bituminous tack material applied and the leveling course shall be thoroughly compacted, using approved compaction equipment.

The City of Lewiston shall provide and operate a mechanical sweeper to clean the work area of the streets to be paved under the City's Street Resurfacing program at no cost to the Contractor. The Contractor shall notify the City at least two working days prior to the City providing any sweeping services. The Contractor will be responsible for reimbursing the City for additional mechanical sweeping of any street previously swept if he/she cancels or postpones the work for any reason other than unexpected weather.

B. Gravel Streets: The City shall grade and compact gravel streets to their proper finished gravel grade and cross section. The Paving Manager and the Highway District Manager will inspect the project prior to paving and shall determine if the street is ready for pavement. The Contractor shall not hold the City liable for any delays to his/her operations if the streets have to be re-worked due to weather conditions, or unforeseen circumstances.

80.04 UTILITIES

The City or the respective utility owner will adjust structures or utility operating controls to proper grade at no expense to the Contractor for accepted City streets. The Contractor shall be responsible for all utility adjustments to structures and all other operating controls on new streets not yet accepted by the City at no cost to the Contractor. The paving Contractor will be required to allow sufficient time for the City or others to raise their utilities before applying the

next course of pavement. The Contractor will be responsible for the cost of repairing any damage caused by him/her to any of these structures after the locations have been marked.

80.05 BITUMINOUS TACK COAT

A bituminous tack coat shall be applied to existing pavement prior to placing a leveling course or an overlay. A tack coat shall be required between a newly installed binder course and a new surface course even if they are placed in the same day. The installation shall be as per the most recent MaineDOT Standard Specifications or as directed by the Engineer or Paving Manager. The asphalt distributor truck shall be capable of applying bituminous material uniformly at various widths and be capable of spraying the edge of any longitudinal joint prior to placement of the adjoining new asphalt mat. The asphalt distributor shall be maintained in a leak free condition. The type and grade of bituminous material shall be submitted to the Engineer at the pre-construction meeting for review and approval. A tack coat shall be applied to any existing pavement a rate of 0.025 gal/yd2, and on milled pavement approximately 0.05 gal/yd2 prior to placing a new course. Payment for the application of tack shall be by the gallon at the Contract unit price.

80.06 COLD PLANING

Any item for Cold Planing shall cover the cost of the Contractor using the appropriate pavement milling machine to grind tapered transverse or longitudinal joints into the existing surface of a street, grind a designated section of a street or an entire street. The equipment for grinding pavement joints or removing small areas of pavement shall be skid steer type equipment or approved equal. Pavement milling equipment for removing a bituminous surface from a whole street or large section of a street shall be a power operated planing machine capable of removing asphalt concrete to the required depth and shall have an automated means of controlling cross slope percentage.

The location of the work shall be marked by the Engineer or Paving Manager and agreed upon by the Contractor prior to cold planing. Groups of streets shall be designated for the work so the Contractor can keep mobilizations to a minimum.

All milled bituminous material removed from the street or road by cold planing shall become the property of the Contractor. The Contractor shall be responsible for transporting and disposing of the reclaimed material at a site approved by the City. If the Contractor chooses not to retain the reclaimed material the Contractor shall then normally be responsible for transporting and disposing or the material at the City Operations Center on River Road in Lewiston. The cost of transporting the removed material shall be incidental to the cost of milling. The Contractor shall locate and remove all objects in the pavement through the work area that would be detrimental to his/her milling equipment. Mobilization, “dig safe” permits and other preparation required to perform this work shall be the responsibility of the Contractor and considered incidental to the cost of removal. Utility owners shall be responsible for lowering utility operating controls such as gate valves below the depth of the milling prior to the start of work, and raising them prior to, or during repaving operations. The respective utilities shall be responsible for the costs associated with the lowering or raising of their facilities in

preparation for milling and paving operations. The cold planing Contractor shall mill around utility manholes that are at proper finish grade. Any manhole or manholes that are not at proper grade shall be lowered and plated by the utility owner at no cost to the paving Contractor.

Removal of pavement surface will be measured by the square yards of pavement removed. The depth of pavement removed, unless otherwise specified, will vary from less than one (1) inch to as much as three (3) inches. No additional payment shall be made based upon the depth of pavement removed. The acceptable quantity of removed pavement will be paid for at the Contract unit price per square yard, which price will be full compensation for removing and salvaging the material, and locating and removing objects detrimental to milling operations. This work shall be done under the direction of the Public Works Engineering Division.

80.07 TRAFFIC CONTROL

The Contractor shall be responsible for maintaining traffic control in the work area and will not be allowed to close the work area to traffic unless he/she receives specific authorization from the Director of Public Works. The Contractor shall be required to submit a written traffic control plan listing all signage, barricades, detours and other important information. This traffic control plan shall be submitted at least forty-eight (48) hours prior to starting work. Emergency vehicles shall have access through the work area at all times. Signage, in compliance with the Manual on Uniform Traffic Control Devices (MUTCD), shall be posted conspicuously in all directions that traffic may approach the work area. The Contractor shall supply the required number of flaggers, signs, barricades and cones. Work shall not begin until the flaggers are in place and the work zone is properly set up. The Engineer or the Paving Manager may require the presence of a uniformed officer and a patrol car at major intersections or on major arterials at no cost to the City. For any night work the requirements of the MUTCD shall apply including the requirement for flagger stations to be properly illuminated. The cost of traffic control will be the responsibility of the Contractor. If the City determines that the Contractor has not provided adequate signage, cones or other means of traffic control, the City Engineer or Paving Manager will stop the paving operation until the Contractor is in full compliance with the requirements of the most recent MUTCD. The City will not be responsible for the cost of any rejected material or labor if a job is stopped due to inadequate traffic control.

80.08 WEIGHING AND DELIVERY SLIPS

The truck platform weighing system and truck delivery slips shall be in compliance with the requirements of the most recent MaineDOT Standard Specification 401.073.

80.09 WEATHER CONDITIONS

Paving will not be allowed under the following conditions:

A. When the existing surface to be paved is wet and appears to glisten. In the event showers or rain occur during the paving operations, the Contractor may be allowed to use whatever mix is in transit **up to a maximum of three haul units** at the time the shower begins at

his/her own risk. The Contractor shall dispose of all material that becomes unusable due to weather conditions at his or her on expense.

B. When the air temperature in the shade at the work area is less than fifty (50° F) degrees Fahrenheit for surface work, and less than forty (40° F) degrees Fahrenheit for base pavement or when the ground is frozen.

C. When the Engineer or Paving Manager feels that the weather or surface conditions prevent the proper handling, placing and finishing of the HMA.

D. Base and surface courses shall not be placed earlier or later than the dates, or minimum temperatures specified in the most recent MaineDOT Standard Specifications.

On street overlay projects with wearing courses less than one (1") thick, the Hot Mix Asphalt shall be placed between May 15th and the Saturday following September 15th .

The Engineer may authorize construction with hot mix asphalt pavements at lower atmospheric temperatures than those specified, or extend the paving dates of the paving season if it is in the best interests of the City to complete a project.

80.10 SATURDAY WORK

When the Contractor elects to work on Saturday, he/she must obtain the approval of the City Engineer or the Paving Manager the day prior to the planned work (Friday). If Friday is a holiday, the approval must be obtained by 8 A.M. Thursday.

80.11 PLANT INSPECTION

The City shall perform any plant inspection and testing it deems necessary during the progress of the work. Such plant inspection and testing will be performed in accordance with the Specifications at no expense to the Contractor. The Contractor shall insure that the plant calibration is within City Specifications at the start of any new non continuous paving operation. The Contractor's Quality Control Plan (QCP) Administrator shall submit new plant mix test results as necessary to satisfy the City that the plant calibration has not changed since the last paving project for the City of Lewiston.

80.12 GRADES

If new finish grades are not shown on the Plans, the Contractor shall sufficiently offset the existing centerline road grades with stakes before removing pavement in order to re-establish the street grades and alignment. If the Engineer or Paving Manager deems that grades are necessary to establish proper profile or cross section, the Contractor will establish and mark such grades and the Contractor shall be responsible for operating his/her equipment to accomplish the work to the exact line and grades so established. The Engineer or Paving Manager shall inspect and accept or reject the grading as meeting specifications.

80.13 MODIFICATION OF MIXTURE

Modifications in the gradation of the aggregate and/or the amount of bitumen in the various mixes may be made to obtain optimum placing and finishing characteristics. Any mix used on a City project shall be a current MaineDOT approved job mix formula. The Engineer or Paving Manager shall approve the new mix design prior to use on any City project. Modifications approved or directed by the City will be made at no change in the unit prices stated in the Contract. The use of Warm Mix under this contract is not currently approved without the prior approval of the Engineer or the Paving Manager.

80.14 JOB-MIX FORMULA

The Contractor shall submit a job mix formula for approval by the Engineer or Paving Manager for each mixture to be supplied to the Project, for each plant from which the HMA shall be produced at. The job-mix formula shall be approved by the MaineDOT, and in compliance with all requirements and Specifications listed in the most current MaineDOT Standard Specification Section 401. The Contractor shall submit for approval, a new job-mix formula each time a change in aggregate source or a change in Performance Graded Asphalt Binder (PGAB) is proposed. In all cases the Contractor shall size, uniformly grade, and combine the aggregate fractions with the amount of PGAB required by the approved JMF. The use of RAP shall comply with the most recent version of the Standard Specification section 401.05. When unsatisfactory results or other conditions make it necessary, the City Engineer or Paving Manager may request a new or revised job-mix formula.

80.15 PAVING OPERATIONS

The Contractor shall perform the work of placing the HMA so that the full width of the street is paved at the end of each day of operation with no exposed longitudinal joints in excess of ten (10) feet in length. Where curb is in place and a reasonable gutter cross section and grade exists, the Contractor will be required to extend the new pavement to the existing curb. The Contractor shall pave the approaches of side streets as directed by the Engineer or Paving Manager. The finished appearance of the surface shall be uniform and smooth with even joints and no segregation. Any mixture that becomes loose, broken, contaminated with gravel, or excessively segregated, or in any way defective, shall be removed at the expense of the Contractor and replaced with fresh, hot material which shall be immediately compacted to conform to the surrounding area.

The Contractor and the City shall agree on how much HMA is placed by the end of each paving day.

Any area containing an excess of bitumen causing the surface to be tacky or "bleed" shall be removed and replaced at the Contractor’s expense. The Contractor shall be responsible for the quality of materials and workmanship. The Contractor shall completely remove and replace any material displaying evidence of poor quality or substandard workmanship within one (1) year from the date of acceptance at no cost to the City.

80.16 HMA TEMPERATURE REQUIREMENTS

The allowable temperature range for HMA in the truck at the mixing plant or at the paver shall be between 275° degrees F and 325°F or as stated in the most recent MaineDOT 401.04. HMA found outside of this temperature range and not in compliance with MaineDOT Specifications shall not be used on this project.

80.17 PAVING EQUIPMENT

If a piece of equipment breaks down or proves faulty, it shall be repaired or replaced before the start of the next paving day. In no case shall equipment continue in use if it is incapable of producing a bituminous pavement mat that is acceptable to the Engineer.

80.18 BITUMINOUS PAVER

Pavers used on City projects shall be of highway class, self-contained and self-propelled. Pavers shall be capable of placing HMA pavement over the full width of the mainline travel way with a minimum ten (10) foot main screed with power activated extensions, for trench paving the contractor may use an eight (8) foot main screed if trenches are eleven feet in width or less. Pavers shall be in compliance with the latest City and MaineDOT Standard Specifications. The Engineer or Paving Manager may approve the use of smaller pavers on smaller projects such as small parking lots or some trench paving. The Engineer or Paving Manager may require a paver designed specifically for sidewalks when deemed necessary.

When HMA pavement is placed on major arterials, or when directed by the Engineer, the Contractor shall use a paver equipped with automatic grade or slope controlled screed. The controls shall automatically adjust the screed to increase or decrease the mat thickness to compensate for irregularities in the preceding course. The Contractor shall operate the paver producing straight passes when possible and a visually uniform wear surface in compliance with City and the most current MaineDOTMaineDOT MaineDOT Standard Specifications.

Pavers shall be at the project site before the start of paving operations to be inspected and approved. Any paver found worn or defective either before or during its use shall be replaced or repaired to the satisfaction of the Engineer or the Paving Manager.

80.19 COMPACTION EQUIPMENT

The compaction equipment used on City projects shall be in full compliance with the most current MaineDOT Standard Specification. On some projects an oscillatory type roller may be specified for breakdown rolling on some projects. The following minimum requirements shall be complied with:

A. Three rollers are required on each project; one ten ton vibratory steel drum roller shall be used for break down rolling. A minimum 16 ton pneumatic tire roller shall be used as an intermediate roller on each project, and a second ten ton vibratory roller shall be used for finish rolling.

B. When paving on smaller projects or sidewalks a smaller roller properly sized for the type of work shall be provided and used.

C. Any method of compaction that results in cracking, checking, or fails to meet the City's minimum density requirements, shall be discontinued and corrective action taken.

D. Some very short paving projects such as, for a culvert replacement, may not require a rubber tire roller. This shall require the approval of the Engineer or the Paving Manager.

80.20 SPREADING AND FINISHING

The mixture shall be laid upon an approved surface, spread and struck off to the grade, elevation and slope established. During placing operations, pavers shall be operated at a speed so as to provide as continuous as possible placement of the HMA.

On small areas, or where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impossible, the HMA shall be spread, raked and luted with hand tools to the required compacted thickness and grade. HMA shall not be dumped from the truck, or an elevated tractor bucket directly onto the ground. It shall be dumped from the truck into wheel barrows and transferred to the desired location and finished as specified above.

When production of the mixture can be maintained and when practical, pavers may be used in echelon to place the surface course in adjacent lanes. On roads opened to two-way traffic, the placement of each course shall be completed over the full width of the travel way section being paved on each day's work unless otherwise approved.

80.21 COMPACTION

HMA placed on City projects shall immediately be compacted in a method complying with the requirements listed in the most current MaineDOT Standard Specification section 401.16.

Care shall be exercised in rolling not to displace the line and grade of the edges of the bituminous mixture. Any new pavement that shows obvious cracking, checking, or other defect shall be removed and replaced as directed by the Engineer or the Paving Manager at no cost to the City.

The roller steel drum or rubber tire shall be kept properly moistened with water or water mixed with very small quantities of detergent or other approved release agent to prevent adhesion of the mixture. The use of fuel oil or other petroleum based release agents shall not be permitted.

Along forms, curbs, headers, catch basins, walls, and other places not accessible to the rollers, the mixture shall be thoroughly compacted with mechanical vibrating compactors. Hand tamping will be permitted only for areas inaccessible to other compaction equipment. On depressed areas, a trench roller may be used or cleated compression strips may be used

under the roller to transmit compression to the depressed area. Excess paving material shall be cleaned from manhole covers and storm drain grating.

80.22 JOINTS

Joints shall be constructed in a manner complying with the requirements listed in the most current MaineDOT Standard Specification. The paver shall always maintain a uniform head of HMA during the joint construction. Transverse joints of the wearing course shall be straight and neatly trimmed. The edge of the mat shall be constructed vertical and rollers or traffic shall not pass over the unprotected end of freshly laid mixture unless authorized by the Engineer or Paving Manager. Feather joints will not normally be permitted without the permission of the Engineer or the Paving Manager.

The Contractor shall apply a uniform coating of an approved bituminous tack to the vertical face of all joints immediately before placing the adjacent mat. The Contractor shall use an approved spray apparatus designed for covering a narrow surface. Application of this material by a brush may be approved for small surfaces, or in the event of a malfunction of the spray apparatus, but for a period of not more than one working day.

80.23 REQUIREMENTS FOR MIXING PLANT, TRANSPORTATION, PLACING AND COMPACTING EQUIPMENT

The Contractor's plant used to produce the HMA to be furnished under this Contract shall be certified by the MaineDOT. By certified, it is meant that the plant producing the HMA pavement material is acceptable for use on MaineDOT bituminous paving projects. The plant shall be capable of heating and drying the aggregate and producing a uniformly mixed material containing an accurately measured amount of bitumen.

The Contractor's plant, transportation, paving and compacting equipment shall be capable of producing, transporting and placing a minimum 700 tons of HMA in a normal 8 hour work day. All paving equipment utilized in material production, transportation or lay down shall comply with the most current MaineDOT standard Specifications and approved by the Engineer or Paving Manager.

Trucks used to transport HMA shall comply with the requirements of the most current MaineDOT Standard Specification. All truck bodies shall have an approved cover and an opening on both sides to accommodate a stem thermometer.

A sufficient number of transport trucks shall be assigned the project to prevent the paver from waiting no more than 30 minutes before the arrival of the next loaded truck.

Proposals not meeting the above requirements will be considered non-responsive.

80.24 TEMPORARY PAVEMENT MARKINGS

The Contractor shall be responsible for placing temporary pavement marking for bi-directional centerline and same direction lane marking after paving major arterial or collector streets. All temporary street markings shall comply with the MUTCD and the most current MaineDOT Standard Specifications. The cost of Temporary Pavement Marking is incidental to the cost of paving. No direct payment will be made.

80.25 ACCEPTANCE, QUALITY CONTROL & QUALITY ASSURANCE

The Contractor shall operate in accordance with a Quality Control Plan (QCP). The Contractor shall submit a written QCP to the Engineer or City Paving Manager at the prepave conference. No work shall be performed until the QCP has been approved. The QCP shall ensure that all material, equipment and procedures meet the requirements of the City and the most current MaineDOT Standard Specifications. The QCP shall detail the coordination of the activities of the Plan Administrator, the PCT and the QCT. The Contractor shall list in the QCP who will act in the above positions.

A. The Plan shall include, but not be limited to the following:

1. All job-mix formulas approved by MaineDOT to be used on the project
2. Hot Mix Asphalt plant details
3. Make and type of pavers
4. Make and type of rollers including weight, weight per inch of steel wheels, and average ground contact pressure for pneumatic tire rollers
5. Name of QCP Administrator and certification number
6. Name of Process Control Technician(s) and certification number(s)
7. Name of Quality Control Technician(s) and certification number(s)
8. Lay down operations; including longitudal joint construction, type of release agent to be used on trucks, tools and rollers, tacking of joints, and methods to ensure segregation is minimized.
9. Examples of Quality Control Forms, including a daily plant report, and a daily field QC report
10 Recommended mixing and compacting temperatures from the PGAB supplier
11. Silo management details
12. Frequency and tests for Quality Control
13. If warm mix technology is to be utilized, a proposed target temperature range (**not to exceed 50 degrees)** will be provided for each mix design to be used on the project
14. Responsibilities of the onsite Paving Supervisor
15. Method of calibration / verification of density gauge
16. A note that all testing will be in accordance with AASHTO and MaineDOT/ACM procedures

B. The Plan shall include the following technicians with these minimum qualifications:

1. Quality Control Plan (QCP) Administrator – The QCP Administrator shall be fully qualified for this position and a full time employee of the Paving Contractor, or a consultant to the paving contractor. He/she shall be certified by the New England Transportation Technician Certification Program (NETTCP) for this position. This individual shall meet all requirements of the most current MaineDOT Standard Specifications.

2. Process Control Technician(s) (PCT) - The PCT shall be assigned to the HMA mixing plant. He/she shall be certified by the NETTCP for this position. This individual shall meet all requirements of the most current MaineDOT Standard Specifications.

3. Quality Control Technician(s) (QCT) - The QCT shall be fully qualified for this position. He/she shall be certified by the NETTCP for this position. This individual shall meet all requirements of the most current MaineDOT Specifications.

C. HMA pavement shall be sampled, tested and evaluated by the Contractor in accordance with the following minimum quality control frequencies:

Table 9: MINIMUM QUALITY CONTROL GUIDELINES

Test or Action	Frequency	Test Method
Temperature of mix	6 per day at street	---
Temperature of Mat	4 per day	---
Density (Surface)	1 per phase per mix	ASTM D2950 or AASHTO T166
Density (Base)	1 per phase per mix	ASTM D2950 or AASHTO T166
Fines/Effective Binder	1 per phase per mix	AASHTO T312
Gradation	1 per phase per mix	AASHTO T30
Asphalt cement content	1 per phase per mix	AASHTO T164 or T308
Voids at Nd	1 per phase per mix	AASHTO T312
Voids in Mineral At Nd	1 per phase per mix	AASHTO T312
Rice Specific Gravity	1 per phase per mix	AASHTO T209
Coarse Agg Angularity	1 per phase per mix	ASTM D5821
Flat/Elongated Particles	1 per phase per mix	ASTM D4791

The Contractor shall submit all HMA pavement testing and inspection reports signed by the appropriate technician by 1 PM the day after the work is performed.

The City reserves the right to conduct any independent asphalt testing it deems necessary for any material provided on this project at no expense to the paving Contractor.

80.26 REJECTION BY ENGINEER OR PAVING MANAGER

For City streets or proposed City streets, the City of Lewiston requires the Contractor, at his/her own expense, to perform density testing by use of a nuclear densometer or by the cutting of a designated number of six inch diameter cores at locations specified by the Engineer or Paving Manager. The City shall specify the method of testing required for a particular project. The City and most current MaineDOT Specifications require field density test results to be between 92% and 98%. When the pavement is tested with a nuclear densometer and any of the test results are outside of City/MaineDOT Specifications, the City may allow the Contractor to cut, remove and test a designated number of six inch diameter cores. The procedure below shall be followed to determine acceptance anytime core samples have been tested for density. The Contractor shall test the core samples using MaineDOT Specifications according to AASHTO T230 procedures. If the density test results fall within the MaineDOT/City Specifications, the material shall be accepted. If one of the results is within the MaineDOT/City Specifications, and one is outside, the two will be averaged and that value will be used to determine acceptance. If both results fall outside the MaineDOT /City Specifications, the City may, depending on the test results, negotiate a reduced price for the pavement, or require the Contractor to completely remove and replace the pavement with material complying with MaineDOT/City Specifications. If the Contractor is required to cut cores in the new pavement he/she shall fill and compact all holes in the new pavement resulting from the cutting of cores using approved materials no later than the following day The Contractor shall clean and apply a coating of emulsified asphalt to the core holes prior to repaving.

The City reserves the right to conduct any independent testing it deems necessary for any material provided on this project at no expense to the Contractor.

80.27 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

HMA pavement materials will be measured and paid by the amount of tons delivered, placed and accepted, with no allowance for bituminous material or additives. HMA pavement for each type of mix shall be based on tonnages on verified delivery slips at the unit prices stated in the proposal and Contract for the class of pavement specified.

End of Section

LANDSCAPE SPECIFICATIONS

PART 1 – GENERAL

1) RELATED DOCUMENTS:

   i) Drawings and general provisions of Contract, including General and Supplementary Conditions apply to this Section.

2) SUMMARY OF WORK:

   i) Extent of Landscape Work is indicated on Drawings and in schedules.

   ii) Provide and furnish all labor, materials and equipment required or inferred from Drawings and Specifications to complete the Work of this Section.

3) QUALITY ASSURANCE:

   i) Industry Reference Standards:
      (a) Refer to Division 1 Reference Standards Section.USDA, NRCS 1999. The PLANTS database (http://plants.usda.gov/plants).
      (b) American National Standards Institute, Inc. (ANSI): ANSI Z60.1-96
      (c) American Standard for Nursery stock by the America Association of Nurserymen.

   ii) Qualifications
      (a) Installer Qualifications: All work under this Section shall be performed by experienced firm specializing in landscape installation. All workers shall be familiar with planting procedures and under full time supervision. Submit written documentation of successful completion of projects of similar size, scope and complexity to work specified for this Project.
         1. Firm Experience Period: Seven years of experience.
         2. Field Foreman Experience: Five years of experience with installing firm.

4) SUBMITTALS:

   i) Plant Material Orders from Approved Nurseries:

      (a) Submit confirmed orders for plant materials from approved nurseries as indicated on the Drawings within 30 days from date that contract is awarded. Contractor is responsible for payment of deposits required by the approved nurseries to secure the plant material for the Project.
      (b) Alternate Nurseries Proposed by Contractor: Alternate nurseries will be considered by the City Arborist only if photographs of specified materials are submitted within 30 days prior to bid due date. The City Arborist will tentatively accept, subject to physical observation and tagging, or reject alternate nurseries within two weeks of submittal date of photographs.

5) DELIVERY, STORAGE AND HANDLING:

i) Provide freshly dug trees and shrubs. Do not prune prior to delivery. Do not bend or bind-tie trees or shrubs in such manner as to damage bark, break branches or destroy natural shape. Provide protective covering during shipment.
   (a) In preparing plants for moving, all precautions customary in good trade practice shall be taken. Balled and burlapped plants shall have a solid ball of earth of minimum specified size (as recommended by ANSI z60.1) held in place securely. Oversize or exceptionally heavy plants are acceptable if the size of the ball or spread of the roots is proportionately increased to the satisfaction of the City Arborist. Broken, loose balls may be rejected.
   (b) All plants shall be packed, transported and handled with utmost care to insure adequate protection against injury and drying. Any inspection certificates required by law shall accompany each shipment invoice or order of stock and, on arrival, the certificates shall be filed with the City Arborist .
   (c) Provide container grown or freshly dug plant materials. Plant materials which have been in cold storage or heeled-in may be rejected. Do not bend or bind-tie trees or shrubs in such manner as to damage bark, break branches or destroy natural shape. Provide protective covering during delivery.
   (d) Deliver plant material after preparation for planting has been completed and plant immediately. If planting is delayed more than 6 hours after delivery, protect from weather and mechanical damage, and keep roots moist.
   (e) Do not remove container grown stock from containers until planting time.
   (f) Label all plant materials of each variety with a securely attached waterproof tag bearing legible designation of botanical and common name.
   (g) Do not remove labels attached to plant material by the City Arborist until directed to do so.

6) PROJECT CONDITIONS:

i) Insurance on plant material and other materials stored or installed is the responsibility of the Contractor. Such insurance shall cover fire, theft and vandalism. Should the Contractor elect not to provide such insurance, he will in no way hold the Owner responsible for any losses incurred by the aforementioned acts. The Contractor is responsible for all costs incurred in replacing damaged or stolen materials prior to Date of Substantial Completion of the Work.

ii) Proceed with and complete landscape work as rapidly as portions of Site become available, working within seasonal limitations for each kind of landscape work required.

iii) Existing Utilities: Determine location of underground utilities. Perform Work in a manner which will avoid possible damage. Excavate as required. Maintain grade stakes set by others unless removal is mutually agreed upon by parties concerned. All damage to utilities resulting from Work covered in these Contract Documents shall be repaired at the Contractor's expense.

iv) Existing Conditions: Perform landscape Work in the Tree Protection Zones and in existing or previously completed landscape areas to avoid damage and disturbance to these areas. Limit work in these areas to only that necessary to perform work specified herein and shown on the Drawings. Return and repair any areas damaged or disturbed while performing the Work to the existing conditions encountered prior to the Work.

v) Planting Time: Plant or install materials during suitable weather conditions.

vi) Planting Schedule: Prepare a proposed planting schedule. Schedule dates for each type of landscape work during contract period. Coordinate schedule with General Contractor and Irrigation Contractor.

vii) Coordination With Lawns: Plant trees and shrubs after final grades are established and prior to planting of lawns, unless otherwise acceptable to City Arborist . If planting of trees and shrubs occurs after lawn work, protect lawn areas and promptly repair damage to lawns resulting from plant operations.

PART 2 – PRODUCTS

1) SOURCE QUALITY CONTROL:

i) Only plant material grown in a recognized nursery in accordance with good horticultural practice will be accepted. Provide healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun-scald, injuries, abrasions or disfigurement.

ii) Inspection of Plant Material Prior to Digging:
   (a) Contractor must locate all plant material to be supplied for the Project and inform the City Arborist in writing of location within thirty (30) days of the date of the Contract or notice to proceed, which ever is first.
   (b) In the event plant material is found to be unacceptable, the Contractor will pursue other sources until acceptable plant material is found.

iii) Shipping:
   (a) Ship landscape materials with certificates of inspection required by governing authorities. Inspection by Federal and/or State Governments at Grower does not preclude rejection of plants at the site by the City Arborist . Comply with regulations applicable to landscape materials. Prepare plants for shipment to prevent damage to the plants.
   (b) If temperature is over 75 degrees Fahrenheit, ship plant material to be transported over 100 miles at night only. Make arrangements to have plant material watered during shipment as necessary to avoid excessive stress. Plant material may be rejected if not properly shipped.
   (c) Do not ship plant material in temperatures below 20 degrees Fahrenheit.

iv) **Do Not Make Substitutions**: If specified landscape material is not obtainable, submit to City Arborist proof of non-availability and request for use of equivalent material. For proof of non-availability submit a written statement from a minimum of 3 reliable nursery sources (American Nurserymen's Association Members) that the plant in question is not obtainable in the Eastern United States.

v) Approval and Selection of Materials and Work: The selection of all materials and the execution of all operations required under the Drawings and Specifications is subject to the approval of the City Arborist. The City Arborist has the right to reject any and all materials and any and all Work which, in his opinion, does not meet the requirements of the Contract Documents at any stage of the operations. The Contractor shall remove rejected work and/or materials from Project site and replace promptly.

2) PLANTING SOIL:

i) Planting Soil Mix For On-Grade Plantings: Provide soil mix amended as per laboratory recommendations. Basic planting soil mix consists of:
   (a) 60% topsoil (as specified)
   (b) 40% prepared additives (by volume as follows)
      1. 2 parts humus and/or peat
      2. 1 part shredded pine bark (bark pieces between 1/2 inch and 2 inches in length)
      3. 1 part sterilized composted cow manure
   (c) Commercial fertilizer as recommended in soil report
   (d) Lime as recommended in soil report

3) PLANT MATERIALS:

i) General:
   (a) All plants shall be nursery grown unless otherwise stated.
   (b) Provide plants true to species and variety, complying with recommendations of ANSI Z60.1 "American Standard for Nursery Stock". Nomenclature to comply with "USDA, NRCS 1999. The PLANTS database (http://plants.usda.gov/plants)."
   (c) All plants shall be legibly tagged with proper botanical names.
   (d) Specific requirements concerning plant material and the manner in which it is to be supplied are shown on the Drawings and plant list.
   (e) Plant material indicated as pre-tagged and pre-purchased on the Drawings has been selected and purchased for the Project by the Owner at the nursery indicated. Contractor shall be responsible for the total installation of the material including freight, labor, profit, complete warranty and replacement, and all items specified herein and as indicated on the Drawings.
   (f) Acclimatization: All woody plant material other than that grown vegetatively shall have been growing within one plant hardiness zone (as defined by Arnold Arboretum) of the location of this project for at least two years prior to award date of this contract.
   (g) All plants shall be subject to approval at their source prior to shipment. All plants shall be clearly labeled. The Contractor shall notify the Landscape Architect at least one week prior to shipping the plants to the job site.
   (h) Plant materials shall be substantially free of damage as a result of handling and transportation.
   (i) All parts of the plant shall be moist and shall show active green cambium when cut.

ii) Quality and Size:
   (a) All plants shall be typical of their species and variety. Plants shall have normal, well-developed branches and vigorous root systems typical of the species. They shall be healthy, vigorous plants free from defects, decay, disfiguring roots, sun-scald injuries, abrasions of the bark, plant diseases, insect pests, eggs, borers, and all forms of infestations or objectionable disfigurements. Furnish nursery grown plants, freshly dug, normally shaped and well branched, fully foliaged when in leaf and with healthy well developed root systems.
   (b) Furnish plants to match as closely as possible whenever symmetry is called for.

(c) Provide trees and shrubs of sizes shown or specified. A plant shall be dimensioned as it stands in its natural position. Large plants which have been cut back to the specified size will not be accepted. Plants that meet the measurements specified, but do not possess a normal balance between height and spread, will not be accepted. Plants shall not be pruned prior to delivery.
(d) Trees and shrubs of larger size may be used if acceptable to the City Arborist , and if sizes of roots or rootballs are increased proportionately. The increased size will not result in additional cost to the Owner.
(e) Stock Specified in a Size Range: Within each size range not less than 50% of the plants must be of the maximum size specified.
(f) Balled and Burlapped Plants: Plants designated "B&B" are to have firm, natural balls of soil corresponding to sizes specified in ANSI Z60.1 "American Standard for Nursery Stock". Balls to be firmly wrapped in biodegradable burlap and securely tied with biodegradable heavy twine, rope and/or wire baskets. Plants with loose, broken or manufactured rootballs will be rejected. Rootballs shall be lifted from the bottom only, not by stems or trunks.
(g) Container grown plants in cans or plastic containers will be acceptable in lieu of balled and burlapped plants provided that they are of specified quality. Container-grown stock shall have been grown in a container long enough for the root system to have developed sufficiently to hold its soil together, firm and whole. No plants shall be loose in the container. The container must be removed prior to planting, with care being exercised as to not injure the plant.

iii) Trees:
(a) Provide trees of height and caliper listed or shown and with branching configuration recommended by ANSI Z60.1 for type and species required. Provide single stem trees except where special forms are specified in the Contract Documents.
(b) Provide self supporting trees with straight trunks and leaders intact. Where required in the Contract Documents, provide trees with character as described.
(c) Determining dimensions for trees are caliper, height and spread: Caliper shall be measured 6 inches above ground for trees up to and including 4 inch caliper. Trees over 4 inch caliper shall be measured 12 inches above ground. Specified height and spread dimensions refer to the main body of the plant and not branch tip to tip. Take measurements with branches in natural position.

iv) Tree Forms: Do not limb up tree forms more than 2 feet before planting. Prune to desired shape as directed by City Arborist.

4) MISCELLANEOUS LANDSCAPE MATERIALS:

i) Burlap for wrapping earthball shall be biodegradable jute mesh not less than 7.2 oz. per square yard. Wrapping materials made from man made fibers are unacceptable.

ii) Stakes and Deadmen: Grade No. 2 or better, uniform grade pressure treated pine LP-22, or sound new hardwood or redwood free of knotholes and other defects. Deadmen shall be 2'-4' long by 4"-8" wide timbers, or other approved material capable of supporting the tree specified for its use.

iii) Anchors: #4 rebars or comparable size steel stakes, 36 inches in length.

iv) Guys and Wire Ties: 2-strand, twisted, pliable galvanized steel wire not lighter than #12 gauge.

v) Hose: 1/2 inch diameter black reinforced rubber or plastic garden hose. Cut to required lengths to protect tree trunks from damage by wires. Used hose is acceptable.

vi) Plastic chain: “Adjust-i-tie” or approved equal.

vii) Clamps: Galvanized or zinc and large enough to hold wire or cable used.

viii) Turnbuckles: Galvanized steel or zinc coated.

ix) Filter Fabric (soil separator): A fiber soil separator approved by the Landscape Architect shall be used to prevent infiltration of soil into drainage aggregate or gravel and to allow free passage of water. Manufacturer's standard nonwoven pervious geotextile fabric of polypropylene, nylon or polyester fibers, or a combination.

(a) Provide filter fabrics that meet or exceed the listed minimum physical properties determined according to ASTM D 4759 and the referenced standard test method:

1. Grab Tensile Strength (ASTM D 4632): 100 lb.
2. Apparent Opening Size (ASTM D 4751): #100 U.S. Standard Sieve.
3. Permeability (ASTM D 4491): 150 gallons per minute per sq. ft.

x) Drainage Gravel: Washed crushed stone.

xi) Water: Shall be furnished by the Contractor unless stipulated otherwise and will be suitable for irrigation and free from ingredients harmful to plant life. Hose and other watering equipment required for the work shall be furnished by the Contractor until Substantial Completion of the project.

xii) Mulch:

(a) Shredded bark: shall consist of bark fibers shredded from either softwood trees or hardwood trees that shall be free of chunks of wood or other debris and whose fibers shall not exceed 4" in length and shall be of a consistent texture and color.

xiii) Anti-Desiccant: Emulsion type, film-forming agent designed to permit transpiration but retard excessive loss of moisture from plants. Deliver in manufacturer's fully identified containers and mix in accordance with manufacturer's instructions.

PART 3 – EXECUTION

1) PREPARATION:

i) General:

(a) Contractor shall examine conditions under which planting is to be installed, review applicable architectural and engineering Drawings, and be familiar with alignment of underground utilities before digging.

(b) Planting Time: Planting operations are to be performed at such times of the year as the job may require, with the stipulation that the Contractor guarantees the plant material as specified. Plant only during periods when weather conditions are suitable.

(c) Verify layout information shown on the Drawings, in relation to property survey and existing benchmarks before proceeding to layout the work. Locate and protect existing benchmarks and control points. Calculate and measure required dimensions. Do not scale Drawings to determine dimensions.
(d) Layout individual tree and shrub locations and areas for multiple plantings. Stake locations and outline areas and secure City Arborist acceptance before start of excavation for planting work. Make adjustments as requested.
(e) Notify City Arborist of adverse sub-surface drainage or soil conditions. State conditions and submit a recommendation for correction including costs. Obtain approval for method of correction prior to continuing work in the affected area. In the event that alternate locations are selected, the Contractor shall prepare such areas at no additional expense to the Owner.

ii) Excavation for Trees and Specimen Shrubs:
(a) Excavate pits, beds and trenches with vertical sides, as specified and as shown on the Drawings.
(b) Loosen hardpan and moisture barrier until hardpan has been broken and moisture is allowed to drain freely.
(c) For balled and burlapped (B&B trees and shrubs), make excavations at least 4 feet wider than the ball diameter for the top 12 inches of the pit. For the remaining depth of the pit, excavate at least 2 feet wider than the full diameter and equal to the ball depth, plus an allowance for setting of ball on a layer of compacted backfill. Allow for 6 inch minimum setting layer of excavated soil.

2) PREPARATION OF PLANTING SOIL:

i) Mix specified soil amendments and fertilizers with topsoil, or soil conditioner with existing surface soil at rates specified. Delay mixing of fertilizer if planting will not follow placing of planting soil within a few days.

3) PLANTING TREES AND SPECIMEN SHRUBS:

i) Set balled and burlapped (B&B) stock on layer of compacted planting soil mixture, plumb and in center of pit or trench with top of ball 2-3 inches above the finish grade and also 2-3 inches above the grade they bore to natural grade before transplanting. Remove all straps and ropes made of man-made fibers completely from rootball. Loosen and remove burlap and biodegradable ropes from top half of rootball. Cut and remove the top half of all wire baskets before backfilling. Use planting soil mixture to backfill plant pits. When plants are set, place additional backfill around base and sides of ball, and work each layer to settle backfill and eliminate voids and air pockets. When excavation is approximately 2/3 full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing final layer of backfill.

ii) Remove all man made or impervious materials from the rootball and trunk before final installation of trees and specimen shrubs.

iii) Mulching: Immediately after planting work has been completed, mulch pits, trenches and planting beds. Provide a minimum depth of 3 inches of bark mulch. Finish edges according to the Drawings.

iv) Water: Soak all plants immediately after planting, continue watering thereafter as necessary until Date of Substantial Completion.

v) Smooth planting areas to conform to specified grades after full settlement has occurred and mulch has been applied.

4) STAKING, GUYING AND PRUNING:

i) Trees shall not be staked unless otherwise directed by the City Arborist. Stake and guy trees immediately after planting. Plants shall be plumb after staking or guying. Maintain stakes, wires and guys until Final Acceptance of the Work.

ii) Guying trees of 3 inch caliper and larger: Guy trees according to detail. Position guys around trunk at approximately two-fifths the height of the tree. Anchor guys in ground either to notched stakes or steel rods driven securely into ground with top end 3 inches below finish grade.

iii) Pruning: Unless otherwise directed by the City Arborist do not cut tree leaders. Remove only injured or dead branches from trees, if any. Prune shrubs at the direction of the Landscape Architect.

iv) Remove and replace promptly any plants pruned or mis-formed resulting from improper pruning.

v) Inspect tree trunks for injury, improper pruning and insect infestation and take corrective measures. Notify City Arborist of any damaged plant stock.

5) MAINTENANCE:

i) Begin maintenance immediately after planting.

ii) Maintain trees as required for healthy growth. Restore planting saucers. Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical position as required. Restore or replace damaged wrappings. Spray as required to keep trees and shrubs free of insects and disease.

6) CLEAN UP AND PROTECTION:

i) During Landscape Work, keep pavements clean and work area in an orderly condition.
   (a) Protect site, landscape work, and materials from damage due to landscape operations, operations by other Contractors and trades and trespassers. Maintain protection during installation and maintenance periods.
   (b) All labeling and other non-organic substances such as flagging, grade ribbons, etc. must be removed from the project prior to provisional acceptance.

ii) Upon completion of Work, clear grounds of debris, superfluous materials and all equipment. Remove from site to satisfaction of City Arborist.

iii) Protect landscape Work and materials from damage due to landscape operations, operations by other contractors and trades and trespassers. Maintain protection during

installation and maintenance periods. Treat, repair or replace damaged landscape Work as directed, at no additional cost to the Owner.

iv) Theft: Contractor is responsible for theft of plant material at the Project site before, during and after planting, until the Date of Substantial Completion of the Work.

v) Restoration: All pavements, sodded and planted areas, structures and substructures not specifically provided for in the contract disturbed by the Contractor during the execution of the work shall be restored by the Contractor, in a manner satisfactory to the City Arborist, to their original condition at no cost to the Owner.

7) OBSERVATION AND ACCEPTANCE:

i) Periodic site visits will be made by the City Arborist to review the quality and progress of the Work. Work found to be unacceptable must be corrected within five calendar days. Remove rejected plants and materials promptly from the Project.

ii) Upon completion of Work, the Contractor shall notify the City Arborist at least ten (10) days prior to requested date of site visit for Substantial Completion of all or portions of the Work. City Arborist will issue a punch list for work to be corrected. All work in the punch list must be completed within five (5) working days from date of site visit. Where Work does not comply with requirements, replace rejected Work and continue specified maintenance until by City Arborist finds work to be acceptable.

iii) If a site visit to verify Substantial Completion has been scheduled and the City Arborist arrives at the site and determines that the Landscape Development is not substantially complete, the Contractor shall be responsible for all costs incurred by the City Arborist to re-visit the site. Reimbursable expenses include but are not limited to the following: mileage, airfare, consultant's time, parking fee, meals, rental car, etc. All incurred expenses will be deducted from the final contract amount.

iv) Certificate of Substantial Completion will be issued for acceptable Work. If punch list items are issued with the Certificate, they must be corrected within five (5) working days.

PART 4 – GUARANTEES AND FINAL ACCEPTANCE

1) WARRANTY:

i) One Year Warranty commences on the date of issuance of the Certificate of Substantial Completion.
   (a) Warranty for a period of one year, following the Date of Substantial Completion, all trees, against any defects including death and unsatisfactory growth, as determined by the City Arborist. Warranty shall include the complete cost to supply and install all replacement plant materials according to the requirements herein. Defects resulting from neglect by the Owner, abuse or damage by others, or unusual phenomenon or incidents beyond the Contractor's control are excepted. Should questions arise concerning the responsibility of replacement, the City Arborist will be available for arbitration provided the Owner and Contractor mutually desire.
   (b) Remove and replace all trees found to be more than 25 percent dead or in unhealthy condition during warranty period as determined by City Arborist.

Make replacements immediately unless required to plant in the succeeding planting season.

(c) Replacements: Match adjacent specimens of same species. Replacements are subject to all requirements stated in the Contract Documents and are subject to inspection by the City Arborist prior to digging.

(d) Repair grades, lawn areas, paving and any other damage resulting from replacement planting operations, at no additional cost to the Owner.

(e) The contractor shall make periodic inspections, at no extra cost, during the guarantee period to determine what changes, if any, should be made in the maintenance program. If changes are recommended, they shall be submitted in writing to the landscape architect. Claims by the contractor that the owner's maintenance practices or lack of maintenance resulted in dead or dying plants will not be considered if such claims have not been documented by the contractor during the guarantee period.

(f) Replacements made during the Warranty Period or following inspection for Final Acceptance will carry on additional one year warranty beginning at the time of replacement.

2) FINAL ACCEPTANCE:

i) At the end of the guarantee period, one year after Date of Substantial Completion of the Work in total, the City Arborist will visit the site to determine Final Acceptance. Upon satisfactory completion of repairs and/or replacements the City Arborist will certify, in writing, the Final Acceptance of the Work. The Final Acceptance letter will serve as evidence that the Contractor's one-year warranty obligations have been met.

ii) Contractor shall remove all staking and guying at the end of one year, with the exception of replaced plants. Contractor shall remove all staking and guying from replaced plants one year after the date of replacement.

END OF SECTION

SPECIFICATION
HIGH PERFORMANCE MODULAR BIOFILTRATION SYSTEM (HPMBS)
Material, Performance and Installation Specification

I. Summary

The following general specifications describe the components and installation requirements for a High Performance Modular Biofiltration System (HPMBS) for filtration of storm water that utilizes physical, chemical and biological mechanisms of a soil, plant and microbe complex to remove pollutants typically found in urban storm water runoff. The modular treatment system in which the biologically active biofiltration media is used shall be a complete, integrated system designed to be placed in Square Foot or Linear Foot increments per the approved drawings to treat contaminated runoff from impervious surfaces.

The High Performance Modular Biofiltration System (HPMBS) is comprised of the following components:

A. Plant Component

1. Manufacturer shall provide a regionalized list of acceptable plants.

2. Plants, as specified in the approved drawings/manufacturer's plant list, shall be installed at the time the HPMBS is commissioned for use.

3. Plants and planting are typically included in landscape contract.

B. Biofilter Component

1. This component employs a high performance cross-section in which each element is highly dependent on the others to meet the performance specification for the complete system. It is important that this entire cross-section be provided as a complete system, and installed as such.

2. As indicated in the approved drawings, the elements of the Biofilter include:

    A. *A mulch protective layer (if specified).*

    B. *An advanced high infiltration rate biofiltration planting media bed which utilizes physical, chemical and biological mechanisms of the soil, plant, and microbe complex, to remove pollutants found in storm water runoff.*

    C. *A separation layer which utilizes the concept of 'bridging' to separate the biofiltration media from the underdrain without the use of geotextile fabrics.*

D. *A <u>wide aperture mesh layer</u> utilized to prevent bridging stone from entering the underdrain/storage element.*

E. *A <u>modular, high infiltration rate 'flat pipe'</u> style underdrain/storage system which is designed to directly infiltrate or exfiltrate water through its surface.*

C. Energy Dissipation Component

1. An Energy Dissipation Component is typically specified to slow and spread out water as it enters the system. This component is dependent upon the design in the approved drawings, but typically consists of a rock gabion, rock filter dam or dense vegetation element, such as native grasses, either surrounding the Biofiltration Component or located immediately upstream of it.

D. Pretreatment Component

1. Pretreatment, when specified, is typically accomplished by locating the Biofiltration Component within a traditional vegetated BMP such as a vegetated swale, vegetated depression, traditional bioretention system, vegetated filter strip, sediment forebay, etc. These BMPs provide primary TSS removal when desirable.

E. Observation and Maintenance Component

1. An Observation and Maintenance Port shall be installed per the approved drawings to provide for easy inspection of the underdrain/storage element, and cleanout access if needed.

F. Extreme Event Overflow (by others)

1. An Extreme Event Overflow should be located external to, but near the Biofiltration element to provide bypass when needed. This may be an overland flow bypass structure, grated inlet, safe overland surface flow, or any configuration that serves the purpose. In the case of an inlet, it must be designed to minimize the likelihood of clogging by vegetative material. Typical inlet solutions involve inclined or dome style inlet grates with a StormSack by FABCO Industries.

II. Quality Assurance and Performance Specifications

The quality and composition of all system components and all other appurtenances and their assembly process shall be subject to inspection upon delivery of the system to the work site.

Installation is to be performed only by skilled work people with satisfactory record of performance on earthworks, pipe, chamber, or pond/landfill construction projects of

comparable size and quality.

A. Plants

1. Plants must be compatible with the HPMBS media and the associated highly variable hydrologic regime. Plants are typically facultative with fibrous roots systems such a native grasses and shrubs.

2. Manufacturer shall provide a regionalized list of acceptable plants.

3. All plant material shall comply with the type and size required by the approved drawings and shall be alive and free of obvious signs of disease.

B. Mulch (if specified)

1. Mulch, typically double shredded hardwood (non-floatable), shall comply with the type and size required by the approved drawings, and shall be screened to minimize fines.

C. Biofiltration Media

1. Biologically active biofiltration media shall be visually inspected to ensure appropriate volume, texture and consistency with the approved drawings, and must bear a batch number marking from the manufacturer which certifies performance testing of the batch to meet or exceed the required infiltration rate.

2. Within 90 days after project completion, the infiltration rate shall be confirmed at the manufacturer's expense, by a wetted condition hydraulic conductivity test.

    a. *Failure to pass this test will result in removal and replacement of all media in the system at no cost to the project owner/operator.*

    b. *Test must utilize the equipment and follow the standard operating procedures found in the Harris County Texas manual entitled, Low Impact Development & Green Infrastructure Design Criteria for Storm Water Management (2011).*

    c. *Replacement media, if required, must be taken from a different batch than the original.*

3. Manufacturer shall provide, at no additional cost to the project owner/operator, maintenance of the biofiltration system for a period of one year.

4. Pollutant Removal performance, composition and characteristics of the Biofiltration Media must meet or exceed the following minimum standards as demonstrated by testing acceptable to the project engineer:

Pollutant	Removal Efficiency
TSS	91%
Phosphorus	64%
Nitrogen	28%
Composition and Characteristics	
Sand - Fine	< 5%
Sand – Medium	10% - 15%
Sand – Coarse	15% - 25%
Sand – Very Coarse	40% - 45%
Gravel	10% - 20%
Infiltration Rate	>100 inches per hour
Peat Moss*	5% - 15%
*** Peat Moss Specification**	
Listed by Organic Materials Review Institute 100% natural peat (no composted, sludge, yard or leaf waste) Total Carbon >85% Carbon to Nitrogen Ratio 15:1 to 23:1 Lignin Content 49% to 52% Humic Acid >18% pH 6.0 to 7.0 Moisture Content 30% to 50% 95% to 100% passing 2.0mm sieve > 80% passing 1.0mm sieve	

D. Underdrain/Storage System

1. Underdrain/storage components shall be manufactured in an ISO certified facility and be manufactured from at least 90% post consumer recycled materials.

2. Underdrain/storage components shall meet or exceed the following characteristics:

Property	Value
Surface Void Area	≥ 85%
Unit Weight	3.25 lbs/cf
Service Temperature	-14° to 167°
Unconfined Crush Strength	32.48 psi
180 Day Creep Test	
Load Applied – Initial and Sustained	11.16 psi
• Creep Sustained – After 180 Days	0.20 inches
• Creep Sustained – After 180 Days	1.13 %
• Projected Creep – 40 years	1.72%

E. Separation Mesh

1. Separation Mesh shall be composed of high-tenacity monofilament polypropylene

yarns that are woven together to produce an open mesh geotextile which shall be inert to biological degradation and resistant to naturally encountered chemicals, alkalis and acids. The mesh shall meet or exceed the following characteristics:

Properties	Test Method	Unit	Min Ave Roll Value	
			MD	CD
Tensile Strength	ASTM D4595	kN/m (lbs/ft)	21 (1440)	25.3 (1733)
Creep Reduced Strength	ASTM D5262	kN/m (lbs/ft)	6.9 (471)	8.3 (566)
Long Term Allowable Design Load	GRI GG-4	kN/m (lbs/ft)	5.9 (407)	7.2 (490)
UV Resistance (at 500 hours)	-	% strength retained	90	
Aperture Size (machine direction)	-	mm (in)	2 (0.08)	
Aperture Size (cross machine direction)	-	mm (in)	2 (0.08)	
Mass/Unit Area	ASTM D5261	g/m^2 (oz/yd^2)	197 (5.8)	

F. Bridging Stone

1. Bridging Stone shall be 3/8" pea gravel, or other diameter sized to prevent migration of filter media, as specified by manufacturer.

2. Stone must be washed and free from sediment, soil and contaminants.

III. Delivery, Storage and Handling

A. Protect all materials from damage during delivery and store UV sensitive materials under tarp to protect from sunlight including all plastics, when time from delivery to installation exceeds one week. Storage should occur on smooth surfaces, free from dirt, mud and debris.

B. Biofiltration media shall be segregated from any other aggregate materials and shall be protected against contamination, including contamination from any stormwater runoff from areas of the site which are not stabilized.

IV. Submittals

A. Product Data

1. Submit manufacturer's product data and approved Installation Manual as well as manufacturer's Operations and Maintenance Manual for the system. It will be the

responsibility of the system owner/operator or their contractor to ensure the system is operated and maintained in accordance with the manual.

B. Certification

1. Manufacturer shall submit a letter of certification that the complete system meets or exceeds all technical and packaging requirements. Biofiltration media packaging must bear a batch number marking from the manufacturer which matches a letter from the manufacturer certifying performance testing of the batch to meet or exceed the required infiltration rate.

C. Drawings

1. Manufacturer shall provide dimensional drawings including details for construction, materials, specifications and pipe connections.

D. Manufacturer's Warranty

1. Manufacturer shall provide a warranty for all components of the HPMBS for a period of one year provided the unit is installed, operated and maintained in accordance with the manual. Improper operation, maintenance or accidental or illegal activities (i.e. dumping of pollutants, vandalism, etc.) will void the warranty. Biofiltration media shall be warranted to pass the post-installation infiltration test described in this document.

E. Substitutions

1. Any proposed equal alternative product substitution to this specification must be submitted for review and approved prior to bid opening. Review package should include third party reviewed performance data for both flow rate and pollutant removal of biofiltration media. Pollutant removal data must follow specified protocols. All components must meet or exceed Quality Assurance and Performance Criteria indicated herein.

V. Project Conditions

A. Review manufacturer's recommended installation procedures and coordinate installation with other work affected, such as grading, excavation, utilities, construction access and erosion control to prevent all non- installation related construction traffic over the completed HPMBS.

B. Cold Weather

1. Do not use frozen materials or materials mixed or coated with ice or frost.

2. Do not build on frozen ground or wet, saturated or muddy subgrade.

3. Care must be taken when handling plastics when air temperature is at 40

degrees or below as plastic becomes brittle.

C. Protect partially completed installation against damage from other construction traffic when work is in progress and following completion of backfill by establishing a perimeter with highly visible construction tape, fencing, or other means until construction is complete.

D. Soil stabilization of the surrounding site must be complete before the Biofiltration System can be brought online. Soil stabilization occurs when 90% of the site has been paved or vegetated. Temporary erosion control and/or sedimentation prevention measures shall be implemented to reduce the possibility of sediments being transported into the Biofiltration System prior to full stabilization of the site. Significant sediment loads can damage the HPBMS and lead to failure if not prevented or remediated promptly.

VI. PRODUCTS

A. Acceptable HPBMS

FocalPoint High Performance Biofiltration System

B. Acceptable Manufacturer or Authorized Sales Representative

FABCO Industries, Inc.
66 Central Ave
Farmingdale, NY 11735
207-831-2795
sgorneau@fabco-industries.com
www.fabco-industries.com

VII. Packaging

A. HPMBS is assembled on site.
B. Modular underdrain/storage unit is shipped flat and modules are assembled prior to installation.
C. Biofiltration media is delivered in one ton super sacks each labeled with manufacturer's batch number and/or in bulk with accompanying manufacturer's certification.
D. Other components are delivered in bulk.

VIII. Execution

A. Excavation and Backfill

1. Base of excavation shall be smooth, level and free of lumps or debris, and compacted unless infiltration of storm water into subgrade is desired. A thin layer (3") of compacted base material is recommended to establish a level working

platform (may not be needed in sandy soils). If the base of the excavation is pumping or appears excessively soft, a geotechnical engineer should be consulted for advice. In many cases, a stabilization geotextile and 6" of compactable material that drains well will be sufficient to amend the bearing capacity of the soil.

2. Most applications require 8 oz Non-Woven Geotextile or equivalent nonwoven geotextile with a nominal weight of 8 oz per square yard to line the excavation to separate in situ soils and the HPMBS. (Applications requiring water to infiltrate the in situ sub-soils should use a bridging stone rather than geotextile to provide a separation layer between the HPMBS and the in situ soils). Geotextile, when utilized, should be placed on the bottom and up the sides of the excavation. Absolutely no geotextiles should be used in the water column. If an impermeable liner is specified, it shall be installed according to manufacturer's instructions and recommendations.

3. Specified backfill material must be free from lumps, debris and any sharp objects that could penetrate the geotextile. Material is used for backfill along the sides of the system as indicated in engineering detail drawings.

B. Inspection

1. Examine prepared excavation for smoothness, compaction and level. Check for presence of high water table, which must be kept at levels below the bottom of the under drain structure at all times. If the base is pumping or appears excessively soft, a geotechnical engineer should be consulted for advice.

2. Installation commencement constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found to be unsatisfactory, contact Project Manager or Engineer for resolution prior to installation.

IX. Cleanup and Protection during Ongoing Construction Activity

A. Perform cleaning during the installation and upon completion of the work.

B. Remove from site all excess materials, debris, and equipment. Repair any damage to adjacent materials and surfaces resulting from installation.

C. If surrounding drainage area is not fully stabilized, a protective covering of geotextile fabric should be securely placed to protect the Biofiltration Media.

D. Construction phase erosion and sedimentation controls shall be placed to protect the inlet(s) to the Biofiltration System. Excessive sedimentation, particularly prior to establishment of plants may damage the HPMBS.

E. Strictly follow manufacturer's guidelines with respect to protection of the

HPMBS between Installation and Commissioning phases.

X. Commissioning

A. Commissioning should only be carried out once the contributing drainage area is fully stabilized. If Commissioning must be carried out sooner, it is imperative that appropriate erosion and sediment controls be placed to prevent the entry of excessive sediment/pollutant loads into the system.

B. Commissioning entails removing the protective covering from the Biofiltration Media, planting the plant material in accordance with the approved drawings, and placing mulch if specified.

1. Dig planting holes the depth of the root ball and two to three times as wide as the root ball. Wide holes encourage horizontal root growth that plants naturally produce.

2. With trees, you must ensure you are not planting too deep. Don't dig holes deeper than root balls. The media should be placed at the root collar, not above the root collar. Otherwise the stem will be vulnerable to disease.

3. Strictly follow manufacturer's planting guidance.

C. Cover the exposed root ball top with mulch. Mulch should not touch the plant base because it can hold too much moisture and invite disease and insects. Evenly place 3 inches of double-shredded hardwood mulch (if specified) on the surface of the media.

D. Plantings shall be watered-in at installation and temporary irrigations shall be provided, if specified.

XI. Using the HPMBS

A. Maintenance Requirements

1. Each correctly installed HPMBS is to be maintained by the manufacturer for a minimum period of one year. The cost of this service is to be included in the manufacturer's price of the system.

2. Annual maintenance consists of two (2) scheduled visits unless otherwise specified.

3. Each maintenance visit consists of the following:

1. Complete system inspection

2. Removal of foreign debris, silt, plant material, trash and mulch (if needed)

3. *Evaluation of biofiltration media*

4. *Evaluation of plant health*

5. *Inspection of underdrain/storage system via Observation/Maintenance Port*

6. *Properly dispose of all maintenance refuse items (trash, mulch, etc.)*

7. *Take photographs documenting plant growth and general system health*

8. *Update and store maintenance records*

9. *To ensure long term performance of the HPMBS, continuing annual maintenance should be performed per the manufacturer's Operations and Maintenance Manual.*

4. If sediment accumulates beyond an acceptable level in the underdrain/storage system, it will be necessary to flush the underdrain. This can be done by pumping water into the Observation/Maintenance Port or adjacent overflow structure, allowing the turbulent flows through the underdrain to re- suspend the fine sediments. If multiple Observation/Maintenance Ports have been installed, water should be pumped into each port to maximize flushing efficiency.

   Sediment-laden water can be pumped out and either captured for disposal or filtered through a Dirtbag filter bag, if permitted by the locality.

XII. Measurement and Payment

Measurement and payment will be based on a per-each basis placed in accordance with the approved plans and specifications. Payment will be based on the units completed and accepted.

TECHNICAL SPECIFICATIONS

HYDRODYNAMIC, VOLUME, & PHYSICAL SPECIFICATIONS OF THE SUNTREE NUTRIENT SEPARATING BAFFLE BOX
MODEL NUMBER: NSBB-5-10-90

1. The stormwater treatment structure is commonly placed on-line or off-line. It will be sized so that the entire flow of an INFLOW pipe will always receive treatment by passing it through the inside of the stormwater treatment structure. The storm water drain filter system comprising; a housing having an inlet thereinto and an outlet therefrom and having a plurality of chambers formed therein below said inlet; a housing cover for access into said housing; a filter screen mounted over each of a plurality of said housing chambers for collecting trash from said storm water passing therethrough, each said filter screen being movable to allow access to the housing chamber therebeneath; an inlet filter screen movably mounted adjacent said housing inlet for filtering drain water entering said inlet; and an oil sorbent boom removably mounted in said housing above one said housing chamber for collecting oil in the drain water entering said housing inlet; whereby an in-line storm water drain filter system filters materials from drain water passing through said storm water drain.

2. For flows of 15 cfs a removal efficiency of at least 80% for TSS will be achieved. Peak flows will based on site specific criteria and be able to pass through the stormwater treatment structure for treatment.

3. The stormwater treatment structure will be able to store captured solid debris such as leaves and litter in a dry state between rain events. The volume of dry storage will be approximately 30.12 cubic feet.

4. The stormwater treatment structure will have the capacity to store approximately 172 cubic feet of captured sediment.

5. The stormwater treatment structure manufacturer shall be capable of submitting verified test data from one of the nationally recognized organizations; NJCAT, TAPE at time of submittals verifying removal efficiencies.

6. The nutrient separating screen system shall be positioned approximately 3.5" above the static water level within the baffle box. Adjacent to the inflow, the screen system will have openings on both sides that have a combined cross sectional area that exceeds the cross sectional area of the pipe. These openings will act as an internal bypass for water flow in the event that the screen system becomes full of debris.

7. The nutrient separating screen system shall have a minimum of 6" of vertical adjustment. Vertical adjustment of the screen system will be via telescoping 3" x 3" aluminum square support poles along the sides of the screen system. The square support poles are anchored to the baffle wall by stainless steel bolts.

8. The nutrient separating screen system shall have a minimum of 3" of horizontal adjustment in the direction of the length of the concrete structure. The brackets that clamp the vertical adjustment poles to the side of the screen system can be repositioned to allow of horizontal adjustment.

9. The nutrient separating screen system shall have a bottom section adjacent to the inflow which is hinged and can be opened for cleaning. This bottom section will function as a screened ramp to direct debris into the main body of the screened system. The sides of the screen system adjacent to the inflow will be made with stainless steel screen and transition in vertical height from a minimum of 8" above the inflow invert to the height of the main body of the screen system. The lower sides of the screen system adjacent to the inflow will provide bypass for water flow around the main body of the screen system if necessary. The cross sectional area of the bypass around the screen system will be equal to or exceed the cross sectional area of the inflow pipe. The bypass adjacent to the inflow along the sides of the screen system can be adjusted as needed by insertion or removal of screened bypass panels.

10. The nutrient separating screen system shall give access from above grade to the lower sediment collection chambers by the following method. The bottom of the screen system will contain hinged screened doors that can be opened in such a way as to allow adequate access for a vacuum truck to remove everything in all the lower collection chambers.

11. The screen system structure will be a welded aluminum framework spanned by stainless steel screen, be generally rectangular in shape, and be formed to make a bottom, 2 long sides, 1 end, and a top; the inflow end will remain open so as to allow water to enter the screen system. The screen system will consist of screened panel sections that are held together with stainless steel bolts. All the panels, access doors, and lids that make up the screen system will be made with stainless steel screen. When the panel sections are unbolted and separated from each other they will be able to pass through an access hatch or round manhole in the top of the baffle box for removal purposes. The aluminum frame work will be made of mostly 2" x 2" x ¼" aluminum angle beam. The screen used to span the aluminum frame is described as follows: For the body of the screen system, flattened expanded stainless steel sheet 3/4" # 13 F; Open area = 75%; Grade = 304 Stainless Steel. The screen will be attached to the screen system frame by sandwiching the screen to the aluminum frame between a series of 1-1/4" x 3/16" aluminum bars and welded in place. Aluminum screen material is not allowed. The screen cannot be attached by riveting the screen to the aluminum framework.

12. Within the settling chambers of the treatment system; deflectors will be configured with specific sizes located at specific locations to reduce turbulence within said settling chambers, and minimize the likelihood of re-suspension of previously captured debris. This system of for increasing efficiencies of storm water baffle boxes to remove pollutants, comprising: a

baffle box having a first sediment settling chamber with a first baffle, with a raised inlet port adjacent to a front wall of the baffle box for allowing storm water to pass into the baffle box and a second sediment chamber with; an inflow deflector in the first sediment chamber adjacent to the inlet portion of the baffle box beneath the inlet port for reducing turbulence of the storm water passing into the sediment chamber to allow for increased settling and less suspension of pollutant particulates; and a flow spreader in the first sediment chamber adjacent to the first baffle for spreading water flow in a wide direction within the baffle box to reduce linear velocity of the flow of the storm water; and a raised outlet port adjacent to a rear wall of the baffle box for passing flow from the storm water to pass out of the baffle box.

13. In the first chamber a series of deflectors will be installed to reduce turbulence in the chamber. The configuration of the deflectors is as follows: Directly under the inflow pipe and inflow of the screen system, a deflector will be attached to the inflow wall. This deflector will measure approximately 48" long x 9" wide and be attached with stainless steel wedge bolts onto the wall. On the inflow side of the first baffle will be a V shaped deflector so that it will spread wide water flow that impacts the inflow side of the first baffle. Under the V shaped flow spreader will be a deflector shape that prevents water that impacts the first baffle from flowing down into toward the bottom of the first chamber. This deflector can be angled or horizontal as needed. Adjacent to the left and right of the inflow pipe will be a corner deflector attached to the inflow wall approximately midway down between the inflow invert and the bottom of the settling chamber. All these deflectors will be made of fiberglass of approximately 3/8" thickness and be attached by stainless steel wedge bolts.

14. In the second chamber a series of deflectors will be installed to reduce turbulence in the chamber. The configuration of the deflectors is as follows: On the downstream side of the first baffle will be a deflector attached near the top of the baffle. This deflector will be angled and measure approximately 58" long x 10" wide. On the inflow side of the second baffle will be a deflector that is angled and measure approximately 58" long x 8" wide. This deflector will be attached at an elevation approximately 6" down from the top of the baffle. All these deflectors will be made of fiberglass of approximately 3/8" thickness and be attached by stainless steel wedge bolts.

15. In the Third chamber a series of deflectors will be installed to reduce turbulence in the chamber. The configuration of the deflectors is as follows: A deflector will be attached on the downstream side of the second baffle and it will be angled and measure approximately 58" long x 10" wide. A deflector will be attached on the outflow wall of the vault and it will be angled and measure approximately 58" long x 8" wide. These deflectors will be attached at an elevation approximately 6" down from the top of the baffle. All these deflectors will be made of fiberglass of approximately 3/8" thickness and be attached by stainless steel wedge bolts.

16. Along each side of the screen system will be a deflector that spans between the inflow wall and the top of the first baffle. This deflector will measure approximately 41" long x 11" wide. This deflector will be angle so as to facilitate the settling of sediments into the settling chambers. All these deflectors will be made of fiberglass of approximately 3/8" thickness and be attached by stainless steel wedge bolts.

17. The structure of the box will be precast concrete. The concrete will be 28 day compressive strength fc = 5,000 psi. Steel reinforcing will be ASTM A - 615 Grade 60. Structure will support an H20 loading as indicated by AASHTO. The joint between the concrete sections will ship lap and the joint sealed with Ram-Nek or equal butyl rubber joint sealant. Two baffles will separate the bottom of the structure into 3 chambers for the settling and collection of sediment. The baffles will be sealed with non-shrink grout to form 3 water tight chambers.

18. For access into the Nutrient Separating Baffle Box, Three 24" Round Openings will be cast into the top of the vault.

19. The inflow and outflow pipes will not intrude beyond flush with the inside surface of the Nutrient Separating Baffle Box. The space between the pipe holes in the ends of the Nutrient Separating Baffle Box and the outside surface of the pipe will be filled with non-shrink grout to form a water proof seal. The invert of the outflow pipe will be even with the tops of the baffles.

20. The SunGlide™ screened lids system will cover the top of the screen system. These lids will consist of 2 panels that cover the body of the screen system in order to prevent floatables from escaping during large rain events during which the hydraulic grade line with the treatment vault system rises above the top of the screen system. There will be a left panel covering the left side of the screen system and a right panel covering the right side of the screen system. To open the lids for access into the screen system each lid panel will slide toward the side of the vault along a track toward the wall of the vault. The left panel will slide toward the left side of the vault and the right panel will slide toward the right side of the vault. For frictionless movement of the screened panels along the track, a wheel system consisting of wheels made of Delrin® spinning on stainless steel axles will be attached to each end of each panel. Vertical adjustment of the screen system will be via telescoping support poles along the sides of the screen system. The treatment vault system will comprise the following: a below grade treatment chamber having an inlet; a filter system positioned within said treatment chamber to receive storm water entering said chamber through said inlet, said filter system including: a filter basket having a rigid frame with screen sides and a top and a bottom; an openable door lid attached across the top of the filter basket having a closed position with the door lid covering the top of the filter basket and an open position; and a plurality of post members extending below bottom edges of the filter basket, and a ;plurality of leg members attached to said chamber, wherein the post members and leg members are telescoping received within one another so that the post members are adjustable to different vertical heights in the chamber, thereby allowing the filter basket to be vertically mounted along different vertical heights of said treatment chamber. The screened lids in the top of the screen system will consist of 2 side by side panels that are each approximately 65" long x 13.75" wide. The aluminum frame work of the screened lid panels will be made of mostly 2" x 2" x ¼" aluminum angle beam. The screen used to span the aluminum frame is described as follows: flattened expanded stainless steel sheet 3/4" # 13 F; Open area = 75%; Grade = 304 Stainless Steel. The stainless steel screen will be welded to the aluminum frame work by sandwiching the screen between the 2" x 2" x 1/4" aluminum angle framing beam and an aluminum match plate. The screened lids will be hinged along the long side of each

panel with stainless steel piano hinge and attach to the top outside of the screen system so that when opened the entire inside of the screen system is easily accessible by a service truck and service personnel. The treatment vault system will be an in-line storm water drain system comprising of a housing having an inlet there into and an outlet therefrom and having a plurality of interior walls, each having a top edge, forming a plurality of open top chambers below said inlet. The filter basket having a rigid frame and a plurality of screened sides and top and bottom and an open front end, said filter basket rigid frame being attached to at least two of said interior wall edges; a pair of side-by-side screen filter doors covering at least a portion of said top for entry into said filter basket; a pair of side-by-side bottom screen filter doors covering at least a portion of said bottom for entry into at least one of said plurality of chambers; and an inlet feed chute attached to said filter basket open front end, and having a pair of sides and a bottom having a screen door therein, said inlet feed chute being positioned in front of said storm water housing inlet for directing entering storm water into said filter basket whereby an in-line storm water drain system filters materials from storm water passing through said storm water drain.

21. The pivoting panel and pylon system, located within the screen system, will act prevent internal backflow currents which will enhance the retention of captured debris within the screen system. The pivoting panel backflow current preventer during storm water treatment, comprising: a screen housing for being placed in a storm water treatment environment, the housing having an inlet end and an outlet end; and a backflow current preventer panel pivotally attached to the screen housing at the inlet end of the screen housing for diverting the incoming water downward through the screen system, wherein the panel pivots inside of the screen housing, and wherein the backflow current preventer stops debris from passing out of the screen system when incoming storm water is flowing through the screen system; wherein the pivoting panel is sloped at an angle to the incoming storm water flowing through the screen system; wherein the pivoting panel is substantially vertically oriented substantially perpendicular to the incoming storm water flowing through the screen system; a hinge that attaches to the top portion of the panel to the screen housing. The pivoting panel to be approximately 1/2 the height of the body of the screen housing when at rest against fixed pylon, span the width of the screen housing, and be constructed of 1/4" extruded fiberglass. The pivoting panel will be attached to the top of the screen housing adjacent to the inflow by means of a stainless steel piano hinge. The pylon will act to prevent backflow currents during storm water treatments, comprising: a screen housing for being placed in a storm water treatment environment, the housing having an inlet end and an outlet end; and a backflow current preventer attached to the screen housing at the inlet end of the screen housing, the backflow current preventer includes: a fixed pylon at the inlet end of the screen housing for diverting the incoming storm water to horizontally split to the left and right sides inside of the screen housing. The fixed pylon will be constructed of fiberglass and bolted to the floor of the screen housing with stainless steel bolts. The pivoting panel will have the articulation to rest against the fixed pylon and be horizontal and parallel with the floor of the screen housing.

22. The HydroSlide™ service system will be incorporated into the stormwater treatment system as a method of improving the ease and efficiency of servicing. The stormwater vault will

comprise: a vault housing having an interior chamber having an upper and lower chamber portion and having a stormwater inlet thereinto and an outlet therefrom, said vault housing having an access entrance thereinto; a water pipe having a plurality of outlets therefrom mounted in the bottom portion of said vault chamber positioned for flushing debris settled in said vault chamber; and a supply pipe located in said vault housing interior chamber and connected to said water pipe, said supply pipe having a water line coupling threreon positioned for coupling a water line thereto from outside said vault housing; thereby providing access to said storm water vault housing to flush settled debris with water while cleaning debris from said vault chamber. The stormwater vault will have a sloped floor portion for driving settle debris towards a predetermined area with water from said water pipe. The floors in each chamber will be sloped per the associated drawing. A brass quick disconnect fitting will rigidly mounted adjacent to each access opening for easy attachment to a service truck. The water pipe conveyance from water source connection point to sprayer nozzles to be rated for six hundred pounds per square inches (600 psi) water pressure. The conveyance between the water supply connection and the lower spray bar will have a 1" inside diameter. The spray bar along the sloped floor will have a 3/4" inside diameter. The nozzles along the spray bar will be aimed to be parallel with sloped floor. All mechanical fasteners used to anchor the HydroSlide system to the vault to be made of stainless steel.